Hiroshima Report 2025

Evaluation of Achievement in Nuclear Disarmament, Non-Proliferation and Nuclear Security in 2024

Hiroshima Organization for Global Peace (HOPe)

Hiroshima Prefecture

Center for Disarmament, Science and Technology The Japan Institute of International Affairs

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Hiroshima Organization for Global Peace (HOPe) TEL: +81-82-513-2466 FAX: +81-82-228-1614 Peace Promotion Project Team, Regional Policy Bureau, Hiroshima Prefectural Government, 10-52 Motomachi, Naka-ku, Hiroshima, 730-8511 Japan chiheiwa@pref.hiroshima.lg.jp https://www.pref.hiroshima.lg.jp/site/peace80-en/

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Preface and Acknowledgements

The Hiroshima Report 2025: Evaluation of Achievement in Nuclear Disarmament, Non-Proliferation and Nuclear Security in 2024 (hereinafter referred to as "Hiroshima Report 2025") is the outcome of the "Hiroshima Report Publication Project,"¹ commissioned by the Hiroshima Organization for Global Peace (HOPe). The project was carried out by the Center for Disarmament, Science and Technology (CDAST) of the Japan Institute of International Affairs (JIIA). The report documents the evolution of measures and proposals related to nuclear disarmament, non-proliferation and nuclear security implemented in 2024. It is published in both Japanese and English.

Since the annual publication of the *Hiroshima Report* began in 2012, the prospect of the abolition of nuclear weapons has remained bleak. The nuclear landscape has grown increasingly precarious. The five nuclear-weapon states (NWS) under the NPT—China, France, Russia, the United Kingdom and the United States—and other nuclear-armed states—India, Israel and Pakistan—as well as North Korea continue to view their nuclear weapons as indispensable components of their national security. To varying degrees, these countries have taken measures to modernize their nuclear forces, update delivery systems, and maintain and strengthen nuclear deterrence in the medium to long term. Despite various efforts to revitalize nuclear disarmament—including arms reductions and nuclear risk reduction, little progress was observed in 2024.

The state of nuclear non-proliferation remains equally severe. North Korea has repeatedly asserted that it has no intention of relinquishing its status as a nuclear-armed state and continues to advance its nuclear weapon program and develop various types of missiles. The United Nations Security Council's North Korea Sanctions Committee's Expert Panel was suspended due to Russia's veto. As for the Iran nuclear issue, efforts to restore the Joint Comprehensive Plan of Action (JCPOA) have not made significant progress. In the meantime, Iran has expanded its stockpile of enriched uranium and increased the enrichment level far beyond the limits set by the JCPOA.

A wide range of challenges related to nuclear security still remains. The current situation surrounding Ukraine's nuclear facilities has further underscored the emerging threats posed by states. While traditional nuclear security efforts have primarily focused on nonstate actors, recent initiatives have also considered the implications of emerging technologies such as artificial intelligence (AI). Addressing insider threats also remains as critical priority. Meanwhile, the number of countries joining relevant treaties continues

¹ This project has been conducted as part of the "Hiroshima for Global Peace" Plan launched by Hiroshima Prefecture in 2011.

to grow. However, at the 2024 IAEA International Conference on Nuclear Security, a ministerial declaration could not be adopted and multilateral efforts, except those led by the G7, were limited.

The *Hiroshima Report* seeks to support the movement toward the abolition of nuclear weapons by clarifying the current status of issues on and efforts for nuclear disarmament, non-proliferation and nuclear security. In doing so, it aims to foster deeper debate on these issues among policymakers, experts both within and outside governments, and civil society. Furthermore, by issuing the "Report" and the "Evaluation" from Hiroshima, the first city to suffer the tragic consequences of nuclear weapons in history, it endeavors to help bring attention to and further promote actions across various fields toward the realization of a world without nuclear weapons.

The Research Committee was established to carry out this project, focusing on investigation, analysis, and evaluation of each target country's efforts toward nuclear disarmament and other related measures, producing the "Report" and the "Evaluation." The committee held meetings to discuss and deliberate on the content and other related matters. The members of the Research Committee are as follows:

Chairperson and Project Coordinator

Nobumasa Akiyama (Director, CDAST, JIIA)

Mao Takahata (Research Fellow, CDAST, JIIA)

Research Members

Kazuko Hikawa (Professor, Nagasaki University)

Junko Horibe (Associate Professor, Nagoya University of Foreign Studies)

Akira Kawasaki (Executive Committee Member, Peace Boat)

Masahiro Kikuchi (CEO, Kikurin Institute of International Politics and Technology)

Mitsuru Kurosawa (Professor Emeritus, Osaka University)

Kazumi Mizumoto (Professor Emeritus, Hiroshima City University)

Michiru Nishida (Professor, Nagasaki University)

Masahiro Okuda (Center for Research and Development Strategy, Japan Science and Technology Agency)

Hiroshi Tamai (Executive Secretary, Mentor Subcommittee, Institute of Nuclear Materials Management (INMM) Japan Chapter)

Hirofumi Tosaki (Associate Professor, Hiroshima University)

The Research Committee appreciates the comments and advice to the "Report" given by the following experts:

Ambassador Nobuyasu Abe (Former UN Under-Secretary-General for Disarmament Affairs and former Commissioner of the Japan Atomic Energy Commission)

Mr. Mark Fitzpatrick (Former Executive Director of the Americas Office and head of the Non-Proliferation and Disarmament Program, International Institute for Strategic Studies)

Dr. Tanya Ogilvie-White (Senior Research Adviser, Asia Pacific Leadership Network)

Professor Tatsujiro Suzuki (Vice Director and Professor, Research Center for Nuclear Weapons Abolition, Nagasaki University)

In this edition, experts posted columns on nuclear disarmament, non-proliferation and nuclear security issues.² The Research Committee also appreciates the efforts of Timothée Albessard, Kazuhisa Ikushima, Shintaro Kawame, Hitomi Maruyama and Yosuke Takano, who provided assistance to edit the *Hiroshima Report*.

The views or opinions expressed in the "Report," "Evaluation" and "Columns" are those of the members of the Research Committee or respective authors, and do not necessarily represent the view of the HOPe, the Hiroshima Prefecture, the JIIA, or the organizations to which they belong. Not all of the members necessarily agree on all of the points discussed.

² The views or opinions expressed in the columns are those of the respective authors, and do not represent the view of the HOPe, the Hiroshima Prefecture, the JIIA, or the organizations to which they belong.

Special Message

Commemorating the 80th year of the atomic bombings

Mr. Hidehiko Yuzaki, Governor of Hiroshima Prefecture

As we approach the 80th year of the atomic bombings, it is with great pleasure that we can publish the Hiroshima Report 2025. As part of its efforts toward abolishing nuclear weapons, Hiroshima Prefecture has commissioned the Japan Institute of International Affairs (JIIA) to publish this report annually since 2013. We would like to take this opportunity to once again express our deepest gratitude to the Japan Institute of International Affairs, the members of the Hiroshima Report Research Committee, and all others who have supported this initiative.

In recent years, the international situation concerning nuclear weapons has become more tense and complex than ever before. The optimistic hopes for nuclear disarmament that have been floating around in the global community since the end of the Cold War have been lost, and fears of nuclear rearmament are once again on the rise. The stagnation of nuclear disarmament negotiations and the division of the international community over nuclear weapons have made the road to the future abolition of nuclear weapons even more difficult. In particular, Russia's invasion of Ukraine highlights the reality that despite decades of nuclear disarmament efforts by the international community, the risk of nuclear weapons use still exists. Russia's repeated threats have made the danger salient that, in the name of nuclear deterrence, nuclear weapons may once again be used as instruments of conflict.

The Treaty on the Prohibition of Nuclear Weapons (TPNW), which entered into force four years ago this January, clearly demonstrates on the international stage the will of nations and civil society that strongly desire the abolition of nuclear weapons, while the gap between nuclear weapon states and non-nuclear weapon states remains a major challenge. Against this backdrop, the Japan Confederation of A- and H-Bomb Sufferers Organizations (Nihon Hidankyo) was awarded the Nobel Peace Prize last December. The achievements of the Nihon Hidankyo, which has long advocated the inhumanity of nuclear weapons, have made the international community aware of the importance of nuclear abolition and contributed significantly to establishing an international norm known as the "nuclear taboo". On the other hand, today, with the aging of the Hibakusha and the shrinking of the Hibakusha population, we must face the critical issue of the role of the Hibakusha, who have conveyed the reality of the atomic bombings to the world and appealed to many people to recognize the inhumanity of nuclear weapons, and how to pass on to the next generation their memories, experiences, and thoughts.

Message

In the year 2025, the 80th year of the atomic bombing, Hiroshima Prefecture will, more than ever, strengthen our initiatives, including holding international conferences, human resource development for peace in cooperation with various entities, and campaigns using websites and social media. These efforts are expected to be a critical turning point that will push the progress toward nuclear abolition to a new level as the compilation of the peace initiatives that Hiroshima Prefecture has implemented over the past decade.

In addition to the incisive analysis of the experts who have contributed to the Hiroshima Report 2025, we have also asked leading experts and peace activists, as well as the wonderful young people who will lead the next generation, to contribute columns on the theme of the 80th period of the atomic bombings. We hope that this publication will help many people deepen their knowledge of the nuclear weapons issue and inspire them to consider the role they can play.

In conclusion, I sincerely hope that the Hiroshima Report 2025 will reach a wider global audience and serve as a significant contribution to fostering momentum toward the abolition of nuclear weapons.

Executive Summary: Nuclear Trends in 2024

In 2024, there was little progress in nuclear disarmament. Nuclear-armed states have not intensified their efforts to fulfill their disarmament commitments, while a substantial nuclear arms race has continued to unfold. Amid Russia's ongoing invasion of Ukraine and escalating regional tensions, the risks of nuclear weapons use has been growing. Nuclear issues concerning North Korea and Iran also remain unresolved, with no sign of progress. Despite these deeply concerning trends, efforts to prevent the further deterioration of the nuclear situation were unsuccessful. Divisions surrounding nuclear issues have deepened not only between nuclear-armed states and non-nuclear-weapons states (NNWS) but also, more critically, among nucleararmed states themselves, making it harder to reach agreements on nuclear issues.

(1) Nuclear Disarmament

Amid the continued stagnation and regression of nuclear disarmament, various efforts and proposals were put forward to reverse these trends and revitalize the process. Despite these efforts, the worsening situation of nuclear disarmament could not be improved, and nuclear-armed states made very little progress in reaching further agreements or implementing concrete nuclear disarmament initiatives.

The United States approached Russia and China, respectively, to discuss nuclear arms control agreements, with no progress.

Nuclear-armed states continue to emphasize the salience of nuclear deterrence in their national security and to modernize their nuclear forces. Particular attention has been drawn to the rapid expansion of China's nuclear arsenal and the possibility of changes in its nuclear strategy. NNWS that are allied with nuclear-armed states also place a high value on extended nuclear deterrence.

The number of countries that have signed or ratified the Treaty on the Prohibition of Nuclear Weapons (TPNW)—which, inter alia, prohibits the possession and the use of nuclear weapons—is steadily increasing. However, nuclear-armed states and their allies have not changed their policy of refusing to sign the treaty.

Nobel Peace Prize awarded to the Confederation of A- and H-Bomb Sufferers Organizations (Nihon Hidankyo)

- The Japan Confederation of A- and H-Bomb Sufferers Organization (Nihon Hidankyo) was awarded the Nobel Peace Prize in October 2024. The organization was rewarded for its grassroots efforts to "achieve a world free of nuclear weapons and for demonstrating through witness testimony that nuclear weapons must never be used again."
- In a speech delivered at the award ceremony in December, Co-Chairperson of *Nihon Hidankyo*, Terumi Tanaka, emphasized the inhumanity of nuclear weapons and the necessity of their abolition. He expressed outrage at

the persistence of nuclear threats and highlighted the importance of conveying this message to future generations. Mr. Tanaka also called for the universal adoption of the TPNW and strongly urged citizens to understand the dangers of nuclear weapons and to pressure their governments into changing their nuclear policies.

The Status of Nuclear Forces (estimates)

- While the total number of nuclear weapons is gradually decreasing to 12,121 (estimated), the number of nuclear warheads in military stockpiles, excluding those retired, as well as the number of nuclear warheads deployed with operational forces are both estimated to have turned upward.
- China has accelerated the expansion of its nuclear arsenal, with an estimated increase of 90 warheads in just one year. India, Pakistan and North Korea have also been gradually increasing their stockpiles of nuclear warheads over the past decade.

Commitment to Achieving a World without Nuclear Weapons

- No country openly opposes the goals of "the total elimination of nuclear weapons" and "a world without nuclear weapons." However, in 2024, nucleararmed states made little progress in the steady and concrete implementation and promotion of nuclear disarmament toward achieving these goals. As a result, many NNWS have intensified their criticism of this situation.
- ➢ 152 countries, including the United

Kingdom and the United States, voted in favor of the Japan-led UN General Assembly (UNGA) Resolution titled "Joint courses of action and futureoriented dialogue towards a world without nuclear weapons." However, China, Russia, North Korea and other countries voted against it.

Humanitarian Consequences of Nuclear Weapons

- NNWS, mainly "humanitarian groups," have emphasized the humanitarian dimensions of nuclear weapons in forums, including the Nuclear Non-Proliferation Treaty (NPT) Preparatory Committee (PrepCom).
- A resolution was adopted at the 2024 UNGA to establish a scientific panel on the effects of nuclear war, with the aim of conducting international research on the multifaceted effects of nuclear weapon use.

TPNW

- By the end of 2024, 73 countries had become states parties to the TPNW.
- TPNW signatory and supporting countries as well as the Scientific Advisory Group (SAG) are constructively preparing for the third Conference of the States Parties (CSP) to the TPNW in 2025.
- Nuclear-armed states and their allies remain opposed to the TPNW. Japan has expressed a cautious stance on participating as an observer in the third CSP, in line with its previous position.

Reduction of Nuclear Weapons

- Since 2023, Russia has maintained its suspension of the New Strategic Arms Reduction Treaty (New START), refusing to provide data or permit onsite inspections. While it claims to comply with the treaty's quantitative limits, its actual compliance has not been verified.
- No nuclear-armed state has unveiled new specific plans or proposals for further reductions of nuclear weapons in 2024. The United States has reached out to Russia and China, respectively, to evoke bilateral arms control discussions. However, Russia has declined, citing allegedly hostile U.S. policies, and China has consistently stated that it would not engage in such discussions unless the United States and Russia, the world's two largest nuclear powers, further reduce their nuclear arsenals.
- All nuclear-armed states continue to modernize their nuclear forces. Notably, Russia and North Korea have been actively pursuing the development and the deployment of various new delivery vehicles for nuclear warheads. China has significantly strengthened its nuclear forces, both qualitatively and quantitatively. The United States estimates that China could be capable of deploying over 1,000 operational nuclear warheads by 2030.

Diminishing the Roles and Significance of Nuclear Weapons in the National Security Strategies and Policies

- As Russia continues its invasion of Ukraine, it has repeatedly resorted to nuclear threats in 2024, heightening international concerns regarding the potential use of nuclear weapons. Furthermore, it has revised the "Fundamentals of State Policy of the Russian Federation on Nuclear Deterrence," which outlines its nuclear doctrine.
- North Korea has stated that the role of its nuclear arsenal is to deter war and to seize the initiative in war. It has explicitly acknowledged the possibility of using nuclear weapons first.
 Furthermore, North Korea continues to strengthen its nuclear forces from both strategic and tactical perspectives.
- There were no significant changes in NWS / nuclear-armed states' policies regarding sole purpose, no first-use, negative security assurances (NSAs) or extended nuclear deterrence (except some changes made by Russia). In response to allegations that China's policies of minimum deterrence and no first use of nuclear weapons may be changing, China has asserted that its nuclear policy and posture remain unchanged.
- Russia has included the provision of extended nuclear deterrence to Belarus in its military doctrine. It is also reported to have deployed tactical nuclear weapons in Belarus.
- In March 2024, Sweden officially joined NATO and became the 32nd memberstate. Poland has stated its readiness to

deploy nuclear weapons on its territory as part of nuclear sharing arrangements.

- Japan and South Korea have been actively collaborating with the United States to strengthen their respective extended deterrence.
- Five nuclear-weapon states (NWS), as well as some NNWS participating in the Stockholm Initiative and other groups, have made various proposals on measures to reduce nuclear risks at the NPT PrepCom and other forums. The United States and China each sent prior notifications to the relevant countries when they conducted ICBM launch tests.

De-Alerting or Measures for Maximizing Decision Time to Authorize the Use of Nuclear Weapons

- There have been no changes in nucleararmed states' policies regarding the alert status of their nuclear forces. Russian and U.S. strategic nuclear forces are considered to remain on high alert status.
- China denied allegations that it has been putting some of its nuclear forces on higher alert.

CTBT

Among the 44 states listed in Annex 2 of the CTBT, whose ratification is a prerequisite for the treaty's entry into force, six states (China, Egypt, Iran, Israel, Russia and the United States) have signed but not ratified, and three (India, Pakistan and North Korea) have not even signed. The treaty has not yet entered into force.

- Except for North Korea, all countries which have declared possession of nuclear weapons maintain a moratorium on nuclear explosion tests. Russia, which withdrew its ratification of the CTBT in 2023, has repeatedly stated that as long as the United States does not conduct nuclear explosion tests, it will not do so either.
- North Korea has reportedly completed preparations for a nuclear explosion test. However, it did not conduct such a test in 2024.
- Some nuclear-armed states are considered to have conducted nuclear tests without explosions, such as subcritical experiments and computer simulations.

FMCT

- At the 2024 session of the Conference on Disarmament (CD) in Geneva, states once again failed to begin negotiations on a Fissile Material Cut-Off Treaty (FMCT). Pakistan continues to strongly oppose the negotiation of a treaty that would only ban the new production of fissile material for military purposes. China, Iran, Pakistan and Russia also voted against the UNGA resolution on an FMCT.
- Japan has established a group called the "Friends of an FMCT" to maintain and strengthen political momentum for an FMCT. Australia, Brazil, Canada, France, Germany, Japan, the Netherlands, the United Kingdom and the United States were among the 12 participating countries. A high-level launch meeting of the "Friends of an FMCT" was held in September.

Summary

China, India, Israel, Pakistan and North Korea are yet to declare a moratorium on the production of fissile material for nuclear weapons. It is believed that India, Pakistan and North Korea continue to produce fissile material for nuclear weapons. There are also concerns that the advanced fastbreeder reactors and reprocessing facilities that China is developing for civilian purposes can be diverted for nuclear weapons purposes.

Transparency in Nuclear Forces, Fissile Material for Nuclear Weapons, and Nuclear Strategy/Doctrine

- There has been no significant change in nuclear-armed states' policies regarding transparency.
- In August 2024, following a similar release in October 2021, the United States declassified and publicly released information about its nuclear weapons stockpiles and the number of dismantled nuclear warheads.
- While China insists that transparency in intentions and policies is important, it has not disclosed any information regarding the types or numbers of its nuclear forces.

Verification of Nuclear Weapons Reductions

- The International Partnership for Nuclear Disarmament Verification (IPNDV), launched by the United States, marked its 10th anniversary. A report was released, which highlighted the key insights gained from its activities over this period.
- Russia has criticized the separate

development of "universal" measures to verify nuclear disarmament, stating that it would not take part in concrete negotiations that do not take the strategic situation into account.

Irreversibility

The United States and Russia are believed to continue the dismantlement or conversion of their respective strategic delivery vehicles, nuclear warheads, and surplus fissile material. However, neither country has provided detailed reports on the concrete status of these efforts.

Disarmament and Non-Proliferation Education and Cooperation with Civil Society

- At the NPT PrepCom, the importance of disarmament and non-proliferation education, diversity and inclusion (notably gender) and the participation of civil society were emphasized. At the 2024 UNGA, a resolution titled "Youth, Disarmament and Non-Proliferation" calling for greater promotion of disarmament and nonproliferation as well as the involvement of young people was adopted without a vote.
- During the first phase of the "Youth Leader Fund for a World Without Nuclear Weapons," funded by Japan, participants visited Hiroshima and Nagasaki in 2024.
- Some countries have started to divest from or ban lending to organizations and companies involved in the production and the development of nuclear weapons. An increasing number of companies are

independently adopting such policies.

Hiroshima and Nagasaki Peace Memorial Ceremonies

Representatives from 109 countries attended the peace memorial ceremony in Hiroshima and representatives from 100 countries attended in Nagasaki. Neither Russia, due to its invasion of Ukraine, nor Belarus, due to its support of the invasion, were invited. Furthermore, the city of Nagasaki chose not to invite Israel, which sparked a backlash from G7 countries (except Japan) and the EU, who did not send ambassadors to the Nagasaki ceremony.

(2) Nuclear Non-Proliferation

As of December 2024, 191 countries have acceded to the Nuclear Non-Proliferation Treaty (NPT). However, three nucleararmed states—India and Pakistan which possess nuclear weapons, and Israel which has not denied possessing them—remain outside and are seen as unlikely to join the treaty in the near future.

North Korea has insisted that it has no intention to renounce its nuclear weapons. Russia expanded its cooperation with North Korea and received North Korean troops and missiles. Russia also vetoed the extension of the expert panel's mandate for the UN Security Council's North Korea sanctions committee.

In response to the U.S. withdrawal from the Joint Comprehensive Plan of Action (JCPOA) in 2018, Iran has consistently expanded its suspension of compliance with the nuclear restrictions outlined in the agreement.

The number of countries that have accepted the International Atomic Energy Agency (IAEA) safeguards under the Additional Protocols has steadily increased. However, more than 30 countries have yet to sign them.

Acceptance and Compliance with Nuclear Non-Proliferation Obligations

- No progress has been achieved in addressing the North Korean nuclear issue. Pyongyang has insisted that it would never relinquish its status as a nuclear-armed state, and that it must rather strengthen it. North Korea has continued to bolster its nuclear and missile capabilities.
- China and Russia have repeatedly issued statements in defense of North Korea's nuclear- and missile-related activities at the UN Security Council and other forums.
- Iran has expanded its stockpile of enriched uranium, including 20% and 60% highly enriched uranium (HEU), and the number and performance of centrifuges well beyond the provisions of the JCPOA. After the adoption of the IAEA Board of Governor resolution in November, Iran has begun increasing its production of 60% HEU.
- Israel and the United States did not participate in the fifth Conference on Establishing a Middle East Region Free of Nuclear Weapons and Other Weapons of Mass Destruction (WMD).

IAEA Safeguards

- As of 2024, 143 NPT NNWS have concluded the IAEA Additional Protocols. Some non-aligned countries as well as Brazil argue that the conclusion of an Additional Protocol should be voluntary, not obligatory under the NPT.
- The IAEA had applied integrated safeguards to 70 NNWS by the end of 2024. In addition, as of June 2024, the Agency had developed and approved state-level safeguards approaches (SLAs) for 137 countries.
- Iran has continued to suspend verification and monitoring measures under the JCPOA, including the application of the Additional Protocol to the IAEA Safeguards Agreement. The IAEA reported that, due to its inability to carry out JCPOA-related verification and monitoring activities for over three and a half years, it has lost continuity of knowledge regarding the production and inventory of centrifuges and other equipment.
- The IAEA reported that it could not resolve the issues regarding the accuracy and completeness of declarations for four sites related to Iran's alleged past clandestine nuclear program. The IAEA has demanded that Iran provide further clarifications and information.
- Saudi Arabia is approaching the completion of its first research reactor. It announced its decision to rescind the Small Quantity Protocol (SQP) and implement the full Comprehensive Safeguards Agreement. Saudi Arabia and the IAEA have agreed that the

agreement will come into force on December 31, 2024.

- Australia, the United Kingdom, and the United States (AUKUS) and the IAEA started technical discussions on implementing IAEA safeguards for the nuclear fuel used in Australia's nuclearpowered submarines. Some countries, including China, expressed criticism and concerns on this issue.
- Russia's attack and occupation of nuclear facilities in Ukraine have compelled the IAEA to undertake challenging safeguard verification activities within Ukraine.

Implementing Appropriate Export Controls on Nuclear-Related Items and Technologies

- Most members of the Nuclear Suppliers Group (NSG) implement solid export controls, including the establishment of legislative measures and other relevant national implementation systems. On the other hand, many countries, in particular developing countries, have been requested to strengthen their systems and their implementation of export controls.
- North Korea continues to engage in illicit trafficking and procurement through, inter alia, ship-to-ship transfers and cyber activities. Russia has also procured missiles and received troops from North Korea. Such transactions constitute a clear violation of the UN Security Council resolutions.
- The UN Security Council's Panel of Experts on North Korea sanctions was

suspended due to Russia's veto of a resolution to extend its mandate.

China has been criticized for its export of nuclear power reactors to Pakistan, which may constitute a violation of the NSG guidelines.

Transparency in the Peaceful Use of Nuclear Energy

Since 2018, China has not submitted its reports based on the Guidelines for the Management of Plutonium. While the United Kingdom and the United States had submitted their report yearly, they did not publish them in 2024.

(3) Nuclear Security

Russia's occupation of the Zaporizhzhia Nuclear Power Plant continues, and there have been multiple attacks on the power grid that connects to other nuclear power plants in Ukraine. As a result of these incidents, nuclear safety and security in those facilities are at risk.

The threat of cyber-attacks against nuclear facilities as well as sabotage involving drones continues to require close attention. While Artificial Intelligence (AI) is utilized for nuclear security, there are concerns about the risks that it poses to nuclear security.

Regarding the global inventory of weapons-usable nuclear material, progress has been made in efforts to minimize Highly Enriched Uranium (HEU). On the other hand, the stockpile of civilian separated plutonium has continued to increase.

South Africa ratified the Amendment to

the Convention on the Physical Protection of Nuclear Material (A/CPPNM.)

Two countries under this survey have received the International Physical Protection Advisory Service (IPPAS).

Physical Protection of Nuclear Material and Facilities

- Regarding the global inventory of weapons-usable nuclear material, while stocks of civilian-use separated plutonium have decreased in Japan and the United Kingdom, those for military-use in India and Israel have increased. As for the HEU, although the total amount of the global inventory has increased due to a change in the calculation approach from the previous year, there are still ongoing efforts to minimize HEU in several countries surveyed.
- 20 out of the 27 countries surveyed still possess weapons-usable nuclear material that could be attractive to terrorists.

Accession to Nuclear Security and Safety-Related Conventions and their Application to Domestic Systems

- South Africa ratified A/CPPNM.
- There were new ratifications for all nuclear security related conventions.
- Regarding the implementation of "Nuclear Security Recommendations on the Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)", some surveyed countries announced their efforts, such as introducing new measures and reviewing existing measures.

Efforts to Maintain and Improve the Highest Level of Nuclear Security

- On HEU minimization for civilian use, Belgium has completed the conversion of fuel for the production of medical radioisotopes to low-enriched uranium. Japan has removed HEU from its multiple facilities. Kazakhstan and Norway have continued their respective technology development cooperation with the United States.
- Japan and the United States have hosted IPPAS missions in 2024.
 Belgium and France have announced plans to accept IPPAS missions.
 Switzerland has published new parts of its past IPPAS mission report.
- \geq The IAEA International Conference on Nuclear Security was held in 2024, but unlike previous conferences, a ministerial declaration was not adopted this time. Regarding multilateral initiatives, activities were carried out by the G7, such as the Non-Proliferation Directors' Group. Meanwhile, the Global Initiative to Combat Nuclear Terrorism (GICNT), co-chaired by the United States and Russia, remained temporarily suspended from all activities since 2022. Initiatives derived from the Nuclear Security Summit Process were also inactive, except for those related to insider threats.

Introduction

(1) Items

In the *Hiroshima* Report 2025, 78 items (41 for nuclear disarmament, 19 for nuclear non-proliferation and 18 for nuclear security) are identified for study, analysis and evaluation of the selected countries' performance, based primarily upon the following documents reflecting widely supported views on the issues of nuclear disarmament, non-proliferation and nuclear security:

- The Action Plan and recommendations pertaining to the implementation of the 1995 Middle East resolution contained in the Final Document adopted in the 2010 Nuclear Non-Proliferation Treaty (NPT) Review Conference;
- The final draft of a Final Document of the 2015 NPT Review Conference;
- The final draft of a Final Document of the 2022 NPT Review Conference;
- Documents adopted at the First Meeting of States Parties (1MSP) to the Treaty on the Prohibition of Nuclear Weapons (TPNW) in 2022;
- Documents adopted at the 2MSP to the TPNW in 2023;
- Seventy-six recommendations contained in the 2009 International Commission on Nuclear Non-Proliferation and Disarmament (ICNND) report titled *Eliminating Nuclear Threats:* A Practical Agenda for Global Policymakers;
- Proposals sponsored or co-sponsored by Japan at the Preparatory

Committees for the 2015 NPT Review Conference; and

"Resolution towards the Abolition of Nuclear Weapons" launched by the Mayors for Peace in 2011.

Items were also chosen with the aim of providing a certain degree of objective measurements for evaluation.

1. Nuclear Disarmament

(1) Status of Nuclear Forces (estimates)
 (2) Commitment to Achieving a World

without Nuclear Weapons
A) Voting behavior on UN General Assembly (UNGA) resolutions on nuclear disarmament proposals by Japan, New Agenda Coalition (NAC) and Non-Aligned Movement (NAM)
B) Announcement of significant policies and important activities
C) Actions that run counter to nuclear disarmament

- (3) Humanitarian Consequences of
- Nuclear Weapons

A) Voting behavior on UNGA resolutions

B) Participations in joint statements

and international conferences

C) Victim assistance and

environmental remediation

(4) Treaty on the Prohibition of Nuclear Weapons (TPNW)

A) Signing and ratifying the TPNWB) Voting behavior on UNGA resolutions on the TPNW

C) Voting behavior on for legally binding UNGA resolutions on prohibition of nuclear weapons

(5) Reduction of Nuclear WeaponsA) Reduction of nuclear weapons

B) Concrete plans for further reduction of nuclear weapons
C) Trends on strengthening/ modernizing nuclear weapons capabilities
(6) Diminishing the Roles and Significance of Nuclear Weapons in National Security
Strategies and Policies

A) Current status of the roles and significance of nuclear weaponsB) Commitment to no first use, "sole

purpose," and related doctrines

C) Negative security assurances

D) Voting behavior on UNGA

resolutions on legally binding security assurances for NNWS

E) Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones

F) Relying on extended nuclear deterrence

G) Nuclear risk reduction

H) Actions that increases nuclear risk(7) De-alerting or Measures for Maximizing Decision Time to Authorize the Use of Nuclear Weapons

(8) CTBT

- A) Signing and ratifying the CTBT
- B) Moratoria on nuclear test explo-

sions pending CTBT's entry into force C) Voting behavior on the UNGA resalution on the CTPT

olution on the CTBT D) Cooperation with the Compre-

hensive Nuclear-Test-Ban Treaty Organization (CTBTO) Preparatory Commission

E) Contribution to the development

of the CTBT verification systems

F) Nuclear testing

(9) FMCT

A) Commitment, efforts, and pro-

posals toward immediate commencement of negotiations on an FMCT B) Voting behavior on the UNGA resolution on an FMCT

C) Moratoria on the production of fissile material for use in nuclear weapons

D) Contribution to the development of verification measures

(10) Transparency in Nuclear Forces, Fissile Material for Nuclear Weapons, and Nuclear Strategy/Doctrine

(11) Nuclear Disarmament Verification

A) Acceptance and implementation of nuclear disarmament verification
B) Engagement in research and development for verification measures of nuclear disarmament
C) International Atomic Energy
Agency (IAEA) inspections to fissile material declared as no longer required for military purposes

(12) Irreversibility

A) Implementing or planning dismantlement of nuclear warheads and their delivery vehicles

B) Decommissioning/conversion of nuclear weapons-related facilities

C) Measures for fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes

(13) Disarmament and Non-ProliferationEducation and Cooperation with CivilSociety

(14) Hiroshima and Nagasaki Peace Memorial Ceremonies

2. Nuclear Non-Proliferation

(1) Acceptance and Compliance with Nuclear Non-Proliferation Obligations A) Accession to the NPT

B) Compliance with Articles I and II

of the NPT and the UN Security

Council resolutions (UNSCRs) on non-proliferation

C) Nuclear-Weapon-Free Zones

D) Actions that run counter to nuclear non-proliferation

(2) IAEA Safeguards Applied to the NPT Non-Nuclear-Weapon States (NNWS)

A) Signing and ratifying a Comprehensive Safeguards Agreement

B) Signing and ratifying an Additional Protocol

C) Implementation of the integrated safeguards

D) Compliance with IAEA Safeguards Agreement

(3) IAEA Safeguards Applied to NWS and Non-Parties to the NPT

A) Application of the IAEA safeguards (Voluntary Offer Agreement or INFCIRC/66) to their peaceful nuclear facilities

B) Signing, ratifying, and implementing the Additional Protocol

(4) Cooperation with the IAEA

A) Cooperation with the IAEA

B) Behaviors impeding IAEA activities

(5) Implementing Appropriate Export

Controls on Nuclear-Related Items and Technologies

A) Establishment and implementation of the national control systems

B) Requiring the conclusion of the

Additional Protocol for nuclear export

C) Implementation of the UNSCRs concerning North Korean and Iranian nuclear issues

D) Participation in the Proliferation

Security Initiative (PSI)

E) Civil nuclear cooperation with nonparties to the NPT

(6) Transparency in the Peaceful Use of Nuclear Energy

A) Reporting on the peaceful nuclear activities

B) Reporting on plutonium management

3. Nuclear Security

(1) The Amount of Weapon-Usable Nuclear Material and Possession of Relevant Facilities

A) The amount of weapon-usable nuclear material

B) Possession of facilities that could cause serious radiological effects

(2) Status of Accession to Nuclear Security and Safety-Related Conventions and

Their Application to Domestic SystemsA) Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the ConventionB) International Convention for the Suppression of Acts of Nuclear Terrorism

C) Convention on Nuclear Safety

D) Convention on Early Notification of a Nuclear Accident

E) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

F) Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency

G) Enactment of laws and establishment of regulations for the national implementationH) INFCIRC/225/Rev.5 (3) Efforts to Maintain and Improve the Highest Level of Nuclear Security

A) Minimization of highly enriched uranium (HEU) in civilian use B) Acceptance of international nuclear security review missions C) Technology development-nuclear forensics D) Capacity building and support activities E) IAEA Nuclear Security Plan and Nuclear Security Fund F) Participation in international efforts (4) Responding to Nuclear Security Threats Posed by States A) Commitment to international norms prohibiting attacks against nuclear facilities for peaceful uses, and strengthening of efforts B) Armed attack against nuclear facilities

(2) Countries Surveyed in This Project

In the *Hiroshima* Report 2025, the performances of selected countries were surveyed, based on their nuclear significance and geographical distribution. The list includes members of the Non-Proliferation and Disarmament Initiative (NPDI), members of the New Agenda Coalition (NAC), and states parties to the Treaty on the Prohibition of Nuclear Weapons (TPNW).

The non-nuclear-weapon states (NNWS)

surveyed were partially reassessed in the Hiroshima Report 2023. Regarding nuclear disarmament and nuclear nonproliferation, the number of countries surveyed are revised from 27 to 22 in order to enhance the survey and analysis of trends per country, taking into consideration the importance of these issues and the willingness to make proposals and implement them. In addition, with regard to nuclear security, the surveyed NNWS are limited to 18 countries that are either actively engaged in nuclear activities or possess a certain amount of nuclear material, and thus potentially pose a high risk to nuclear security.¹

The *Hiroshima* Report 2025 surveys the following countries.

- Five nuclear-weapon states under the NPT (China, France, Russia, the United Kingdom and the United States)
- Non-state parties to the NPT possessing or believed to possess nuclear weapons (India, Israel and Pakistan)
- Non-nuclear-weapon states under the NPT
 - Nuclear disarmament and nonproliferation: Australia, Austria, Brazil, Canada, Egypt, Germany, Indonesia, Iran, Japan, Kazakhstan, South Korea, Mexico, the Netherlands, New Zealand, Norway, Poland, Saudi Arabia, South Africa, Sweden, Switzerland, Syria and Turkey

¹ Criteria for selecting countries for the survey are those with a certain level of nuclear activities or with at least 1 kg of HEU. "A certain level of nuclear activity" include possessing or planning to possess in recent years commercial nuclear reactors in operation (cf: Turkey is scheduled to begin operation in 2024) or a spent fuel final disposal site (Finland).

- Nuclear security: Australia, Belgium, Brazil, Canada, Finland, Germany, Iran, Japan, Kazakhstan, South Korea, Mexico, the Netherlands, Norway, South Africa, Sweden, Switzerland, Turkey and the UAE
- Other (North Korea²)

(3) Approach

This project focuses on the time period of the calendar year 2024. Reference documents are primarily open sources, such as speeches and working papers delivered at disarmament fora, and official documents published by governments and international organizations.

In the evaluation section, a set of objective evaluation criteria is established by which each respective country's performance is assessed.

The Research Committee of this project recognizes the difficulties, limitations and risks of "scoring" countries' performances. However, the Committee also considers that an indicative approach is useful to draw attention to nuclear issues, so as to prompt debates over priorities and urgency.

The different numerical values within each category (i.e., nuclear disarmament, nuclear non-proliferation and nuclear security) reflect each activity's importance within that area, as determined through deliberation by the Research Committee of this project. However, the differences in overall score totals among each of the three categories do not necessarily reflect a category's relative significance in comparison with others, as it has been driven by the differing number of items surveyed. Thus, the total value assigned to nuclear disarmament (maximum score of 109) does not mean that it is more important than nuclear non-proliferation (maximum score of 61) or nuclear security (maximum score of 38).

Regarding the "number of nuclear weapons" (in the nuclear disarmament section) and the "amount of fissile material usable for nuclear weapons" (in the nuclear security section), the assumption is that the more nuclear weapons or weapons-usable fissile material a country possesses, the greater the task of reducing them and ensuring their security. However, the Research Committee recognizes that "numbers" or "amounts" are not the sole decisive factors. Certainly, other factors-such as implications of missile defense, chemical and biological weapons, conventional force imbalances and a psychological attachment to a minimum overt or covert nuclear weapon capability-also affect the issues and process of nuclear disarmament, nuclear non-proliferation and nuclear security. However, such factors were not included in our criteria for evaluation as it was difficult to devise objective scales of the significance of these factors. In addition, in light of the suggestions and comments made with respect to the Hiroshima Report 2013, the Research

² North Korea declared its suspension from the NPT in 1993 and its withdrawal in 2003, and conducted nuclear tests in 2006, 2009, 2013, twice in 2016, and 2017. However, there is no agreement among the states parties on North Korea's official NPT status.

Committee modified the criteria of the following items: the current status of the roles and significance of nuclear weapons in national security strategies and policies; reliance on extended nuclear deterrence; and nuclear testing. Since the *Hiroshima Report 2014*, these items have been negatively graded if applicable.

As there is no way to mathematically compare the various factors contained in the different areas of disarmament, nonproliferation and nuclear security, the evaluations should be taken as indicative of performances in general and not as an exact representation or precise assessment of different countries' performances.

The Hiroshima Report 2025 maintains basically the same structure and items as previous years' reports, while one item on the TPNW has been added since the Hiroshima Report 2018. Besides this, beginning with the Hiroshima Report 2019, the Research Committee has added an evaluation item addressing whether the respective countries attended the Hiroshima or Nagasaki Peace Memorial Ceremonies while only attendance at the Hiroshima Peace Memorial Ceremony had been evaluated until the Hiroshima Report 2018. (The maximum score of three points for this item remains the same.) Since the Hiroshima Report 2020, increases in the number of possessed nuclear weapons in the previous five years, as well as activities that are not covered by the existing evaluation items but are nevertheless deemed contrary to nuclear disarmament and non-proliferation are also negatively graded, if applicable. Furthermore, since the Hiroshima Report

2021, the scale of measurement used for a few of the evaluation criteria in terms of nuclear non-proliferation and nuclear security have been slightly modified.

Furthermore, in the *Hiroshima Report 2023*, the evaluation items and evaluation criteria were modified to reflect changes in the situation in light of new trends surrounding nuclear issues and the 2022 NPT RevCon and the First meeting of States Parties to the TPNW. The changes are described in "Evaluation Points and Criteria" in Part II.

In this *Hiroshima* Report 2025, the Research Committee introduced new evaluation criteria concerning: voting behaviors on the UNGA resolution on victim assistance and environmental remediation; and whether nuclear-armed states have designated all their civilian nuclear facilities for IAEA safeguards.

Part I: Report

Surveying Trends of Nuclear Disarmament, Non-Proliferation and Nuclear Security in 2024

Special Feature

Nobel Peace Prize awarded to the Confederation of Aand H-Bomb Sufferers Organizations

On October 11, 2024, the Norwegian Nobel Committee announced the awarding of the Nobel Peace Prize to the Japan Confederation of A- and H-Bomb Sufferers Organizations (Nihon Hidankyo).¹ In a statement, the Nobel Committee, chaired by Jørgen Watne Frydnes, provided the following reasons for the award:²

This grassroots movement of atomic bomb survivors from Hiroshima and Nagasaki, also known as Hibakusha, is receiving the Peace Prize for its efforts to achieve a world free of nuclear weapons and for demonstrating through witness testimony that nuclear weapons must never be used again. [...]

The testimony of the Hibakusha – the survivors of Hiroshima and Nagasaki – is unique in this larger context.

These historical witnesses have helped to generate and consolidate widespread opposition to nuclear weapons around the world by drawing on personal stories, creating educational campaigns based on their own experience, and issuing urgent warnings against the spread and use of nuclear weapons. The Hibakusha help us to describe the indescribable, to think the unthinkable, and to somehow grasp the incomprehensible pain and suffering caused by nuclear weapons. [...]

The extraordinary efforts of Nihon Hidankyo and other representatives of the Hibakusha have contributed greatly to the establishment of the nuclear taboo. [...]

The nuclear powers are modernising and upgrading their arsenals; new countries appear to be preparing to acquire nuclear weapons; and threats are being made to use nuclear weapons in ongoing warfare. At this moment in human history, it is worth reminding ourselves what nuclear weapons are: the most destructive weapons the world has ever seen.

Next year will mark 80 years since two American atomic bombs killed an estimated 120,000 inhabitants of Hiroshima and Nagasaki. A comparable number died of burn and radiation injuries in the months and years that followed. Today's nuclear weapons have far greater destructive power. They can kill millions and would impact the climate catastrophically. A nuclear war could destroy our civilisation. [...]

The core of Alfred Nobel's vision was the belief that committed individuals can make a difference. In awarding this year's Nobel Peace Prize to Nihon Hidankyo, the Norwegian Nobel Committee wishes to honour all survivors who, despite physical suffering and painful memories,

¹ Tamayo Muto, Yuichi Shiga, "Japanese Atomic Bomb Survivors' Group Wins 2024 Nobel Peace Prize," *Nikkei Asia*, October 11, 2024, https://asia.nikkei.com/Politics/Japan-s-Nihon-Hidankyo-wins-2024-Nobel-Peace-Prize.

² "The Nobel Peace Prize 2024 – Press Release," *The Nobel Foundation*, October 11, 2024, https://www.nobelprize.org/prizes/peace/2024/press-release/.

have chosen to use their costly experience to cultivate hope and engagement for peace.

Nihon Hidankyo has provided thousands of witness accounts, issued resolutions and public appeals, and sent annual delegations to the United Nations (UN) and a variety of peace conferences to remind the world of the pressing need for nuclear disarmament.

One day, the Hibakusha will no longer be among us as witnesses to history. But with a strong culture of remembrance and continued commitment, new generations in Japan are carrying forward the experience and the message of the witnesses. They are inspiring and educating people around the world. In this way they are helping to maintain the nuclear taboo – a precondition of a peaceful future for humanity.

At the ceremony held on December 10, Mr. Terumi Tanaka, Co-Chairperson of the Japan Confederation of A- and H-Bomb Sufferers Organizations, delivered the following speech, calling for nuclear abolition to the international community:³

We established Nihon Hidankyo, the Japan Confederation of A- and H-Bomb Sufferers Organizations, in August 1956. Having ourselves survived the inhumane impacts of the atomic bombings, damage unprecedented in history, we launched this movement to ensure such suffering would never be repeated, with two basic demands. The first demand is that the State which started and carried out the war should compensate victims for the damage caused by the atomic bombs, in opposition to the Japanese government's assertion that, "the sacrifice of war should be endured equally by the whole nation." The second is to demand the immediate abolition of nuclear weapons, as extremely inhumane weapons of mass killing, which must not be allowed to coexist with humanity.

Our movement has undoubtedly played a major role in creating the "nuclear taboo". However, there still remain 12,000 nuclear warheads on the Earth today, 4,000 of which are operationally deployed, ready for immediate launch. The nuclear superpower, Russia, threatens to use nuclear weapons in its war against Ukraine, and a cabinet member of Israel, in the midst of its unrelenting attacks on Gaza in Palestine, even spoke of the possible use of nuclear arms. In addition to the civilian casualties, I am infinitely saddened and angered that the "nuclear taboo" threatens to be broken. [...]

Nihon Hidankyo worked in solidarity with the associations of A-bomb survivors formed in each country, and both in law courts and through joint actions, urged the government of Japan to act, which led to the provision of almost the same support for the A-bomb survivors abroad as those in Japan.

Our movement has continued to call for the immediate elimination of nuclear weapons, urging our own government, the nuclear weapon states, and all other

³ "Nobel Prize Lecture Given by Nobel Peace Prize Laureate 2024 Nihon Hidankyo," *The Nobel Foundation*, December 10, 2024, https://www.nobelprize.org/prizes/peace/2024/nihon-hidankyo/ lecture/. Co-Chairperson Terumi Tanaka also underlined the Japanese government's failure to provide national compensation to atomic bomb survivors.

states to take action. [...]

Please try to imagine — there are 4,000 nuclear warheads, ready to be launched immediately. This means that damage hundreds or thousands of times greater than that which happened in Hiroshima and Nagasaki could happen right away. Any one of you could become either a victim or a perpetrator, at any time. I therefore plead for everyone around the world to discuss together what we must do to eliminate nuclear weapons, and demand action from governments to achieve this goal.

The average age of the A-bomb survivors is now 85. Ten years from now, there may only be a handful of us able to give testimony as firsthand survivors. From now on, I hope that the next generation will find ways to build on our efforts and develop the movement even further.

To achieve further universalization of the Treaty on the Prohibition of Nuclear Weapons and the formulation of an international convention which will abolish nuclear weapons, I urge everyone around the world to create opportunities in your own countries to listen to the testimonies of A-bomb survivors, and to feel, with deep sensitivity, the true inhumanity of nuclear weapons. Particularly, I hope that the belief that nuclear weapons cannot — and must not - coexist with humanity will take firm hold among citizens of the nuclear weapon states and their allies, and that this will become a force for change in the nuclear policies of their governments.

Column 1

The Empowerment of Woman in Disarmament and Peace Education

Ambassador Shorna-Kay Richards

Representing over half of the world's population, women have been, continue to be, a powerful force for change in relation to disarmament affairs and their policymaking and advocacy roles should be supported and utilized effectively.

With the global peace and security environment in serious peril, it can no longer be business as usual. As the Nuclear Age Peace Foundation has observed "the men's club that has dominated our military, defense and nuclear weapons policies for decades has got to evolve along with their antiquated attitudes"¹. This prevailing military, statecentric and male-dominated view of security represents a narrow perspective which demonstrably has not contributed to lasting peace and security. Rather, we find ourselves in a perpetual cycle of security and conflict requiring annual expenditure of 2.46 trillion² on militaristic solutions. This approach is failing us.

and the clarion call for change to save humanity could not be more urgent.

Indeed, the 2024 Nobel Peace Prize award to Nihon Hidankyo coupled with the 80th anniversary this year of the atomic bombings of Hiroshima and Nagasaki are a powerful reminder of the urgency to rid the world of nuclear weapons. This urgency has been reinforced by the recent escalation of geopolitical conflicts across the globe. And alarmingly, the deteriorating international security environment has seen heightened threats to use nuclear weapons.

How can we translate this urgency into momentum toward achieving lasting peace?

We need a transformative approach to disarmament that advances the cause of international peace and security – a people-based security first and foremost (human security). New and lasting solutions require diversity of representation and experience in order to solve the issues threatening humanity's survival. An important lesson from the historic Treaty on the Prohibition of Nuclear Weapons (TPNW)³ is that diversity among stakeholders, including gender perspectives, is essential.

The UN Security Council Resolution 1325

It is time to move beyond the status quo

¹ Nuclear Age Peace Foundation 's Women Waging Peace Luncheon September 2024, see https://www.wagingpeace.org/women-waging-peace/.

² International Institute of Security Studies' Military Balance Report, see https://www.iiss.org/online-ana lysis/military-balance/2025/02/global-defence-spending-soars-to-new-high/.

³ For the text, see United Nations, Treaty on the Prohibition of Nuclear Weapons, https://disarmament. unoda.org/wmd/nuclear/tpnw/.

on Women, Peace and Security (WPS)⁴, which this year marks its 25th anniversary, established the right of women to engage in issues of war and peace, and recognized the role that women play in preventing, managing and recovering from conflict. Disarmament diplomats have gradually realized the importance of connecting the WPS framework, as well as gender equality considerations, with efforts to ban, limit or control weapons.⁵

Despite the landmark UN resolution and subsequent efforts, the international security field remains male-dominated. Recent data collected by UNIDIR shows that women represent only a third of the diplomats accredited to arms control and disarmament forums.⁶ In fact while progress is being made, as the Nuclear Age Peace Foundation points out, "women's voices are still often ignored, their efforts stonewalled, and their wisdom overlooked regarding issues of peace and security, national defense, and nuclear disarmament"⁷.

Notably, the inclusion of gender perspectives will enhance awareness of the ways in which war and weapons are coded with gender norms and stereotypes. In nuclear weapons discourse, for example, proponents of nuclear weapons seek to use the logic of rationalism and power to defend their possession of these weapons whilst seeking to "feminise" opponents of nuclear weapons by labeling them as emotional or irrational. The awareness enabled by gender perspectives can focus minds on why these weapons exist and who benefits from their proliferation.

How can women be empowered to participate in policymaking, negotiations and serve as a critical resource in advocacy and awareness raising to mobilize public opinion for disarmament?

Training and capacity building are essential to building a critical mass of women, especially from the Global South, working in the fields of disarmament, non-proliferation and arms control. A critical mass of women is necessary in order to bring gender perspectives both to negotiations and to the elaboration of the relevant disarmament instruments, as well as to exert influence in prioritizing conflict prevention and the promotion of a culture of peace.

Efforts should also be made to support the development of expertise among women in all areas of disarmament skills to facilitate increased gender balance among of education and training programmes. Although recent initiatives have contributed to progress in this area,

⁴ For the text of United Nations Security Council Resolution 1325 (2000), see https://digitallibrary.un.or g/record/426075?ln=en&v=pdf.

⁵ The Convention on Cluster Munitions includes a reference to Resolution 1325 in its preamble and also encompasses gender-sensitive victim assistance among its operational provisions. Other disarmament treaties and conventions also include gender perspectives, such as the Arms Trade Treaty and the TPNW.

⁶ See https://unidir.org/tools/gender-disarmament-hub/.

⁷ Nuclear Age Peace Foundation's Women Waging Peace Luncheon September 2024, see https://www.wagingpeace.org/women-waging-peace/.

such as the "Women in Cyber Fellowship" and the UNIDIR "Women in AI Fellowship", it is important to ensure their sustainability through dedicated funding.

As a female diplomat from the Global South, I have seen the value of disarmament education through my participation in the UN Programme of Fellowship on Disarmament. A truly defining moment in my career was the 2005 study visit under this Programme to Hiroshima and Nagasaki, where I was exposed first-hand to a story of profound tragedy and heard the heart-wrenching and courageous testimony of the atomic bomb survivors (Hibakusha). This personal experience broadened my awareness and deepened my understanding of the Hibakusha's warning that no one else should ever suffer as they had. And I made a promise to advance the Hibakusha's plea and advocate for nuclear disarmament.

Since that visit 20 years ago, I have kept my promise and I am privileged to have the opportunity to represent my country on the issue of nuclear disarmament, including participation in the process leading to the negotiations of TPNW. Furthermore, in response to Hibakusha's appeal, I have become actively involved in peace education and youth empowerment.

Today, I am encouraged by the growing acknowledgement of the importance of gender perspectives through women's participation. As I witnessed during the negotiations of the TPNW, women have contributed significantly to driving change in the disarmament arena, in part by changing the narrative and demanding a more equitable, peaceful and nuclear-weapons-free world.

Ambassador Extraordinary and Plenipotentiary of Jamaica to Japan

Column 2

Disarmament and Non-Proliferation Education to Foster the Ability to Resist the Threat of Nuclear Weapons

Masako Toki

"Education is, quite simply, peace-building by another name," was the remark once issued by the former UN Secretary-General, the late Kofi Annan. With the current heightened sense of crisis in the security environment and the future uncertain, we need to return to this quote and tackle problems from a long-term perspective.

I studied international policy and nonproliferation of weapons of mass destruction in graduate school in the U.S. Then, I am implementing projects that promote disarmament and nonproliferation education, mainly for young people, at the James Martin Center for Nonproliferation Studies, which is affiliated with my graduate school. As I studied and have been working under CNS Founding Director William Potter who is respected by those involved in the field as a pioneer in disarmament and non-proliferation education and has made a significant contribution to the "United Nations study on disarmament and nonproliferation education" adopted by the UN General Assembly in 2002, I am acutely aware of the importance of

disarmament and non-proliferation education, especially for the next generation. However, I am concerned about the current lack of it despite the growing nuclear threat.

The risk of nuclear weapons is rising once again with the recent deterioration of the international situation. There was a temporary trend toward disarmament and reduction of nuclear weapons after the end of the Cold War; however, countries today are reconsidering their nuclear strategies, and there are even signs of a nuclear arms race.

With the outbreak of the Russo-Ukrainian war, the political use of nuclear weapons has become more salient as seen in Russia making nuclear threats. In addition, as the Sino-American tension has continued, the nuclear policies of both countries are being reassessed, and the progression of military technology is changing the concept of nuclear deterrence. The complex interplay of these factors threatens the framework of nuclear nonproliferation.

Furthermore, the international framework of nuclear disarmament and nonproliferation has stagnated and declined in recent years, with the NPT Review Conference failing to reach an agreement, the CTBT still not coming into effect, and Russia withdrawing its ratification in November 2023. Although the TPNW entered into force in 2021, and a new trend toward the outlawing of nuclear weapons is emerging, nuclear weapon states and their allies are not participating, leading some to fear that this will deepen
the polarization of the debate over nuclear disarmament.

Also, emerging technologies are changing the operation and management of nuclear weapons; it is essential as well to discuss the technical aspects in the field of disarmament and non-proliferation because developments in AI technology and cyber warfare could become new risk factors for nuclear strategy.

It is imperative to learn the reality of atomic bombings, harvest the skill of critical thinking, and promote crosscultural interactions and understandings for constructing a peaceful society without nuclear weapons, no matter how technologies advance and how the situation surrounding nuclear weapons deteriorates.

Under these circumstances, the role of disarmament and non-proliferation education has never been more critical. Correctly understanding the threat of nuclear weapons through education and telling its dangers to the next generation is the first step toward realizing a world without nuclear weapons.

In Japan particularly, peace education is being facilitated through the testimonies of A-bomb survivors in Hiroshima and Nagasaki, which must be passed on to the next generation. As we all know, it is the role of the younger generation to propagate and tell the world the reality of the use of nuclear weapons from Hiroshima and Nagasaki; that is the most important part of disarmament education.

In each country, it is also necessary for

universities and research institutions to enhance their programs to train specialists in the field. Providing measures and funding to encourage young people to participate in international conferences and workshops is essential to increase their interest in disarmament and nonproliferation issues. Funding for those who give and receive education is critical in ensuring that disarmament and nonproliferation education does not become for a privileged few.

The fact that the Nobel Peace Prize 2024 was awarded to the Nihon Hidankyo, which has long appealed for the reality of A-bombing, is an international recognition of the efforts of Hibakusha, who have continued to call for the abolition of nuclear weapons over the years; the Hibakusha's testimonies played a remarkably critical role in understanding the inhumanity of nuclear weapons. They can be said to contain a strong warning that the surrounding situation is deteriorating significantly as well as a potent objection against the nuclear deterrence theory.

Jørgen Watne Frydnes, chair of the Norwegian Nobel Committee, in a thought-provoking speech at the award ceremony, said.

"One day, the Hibakusha will no longer be among us as witnesses to history. But with a strong culture of remembrance and a continuing commitment, younger generations in Japan and elsewhere are carrying forward the experience and the message of the witnesses. They too have inspired and educated people around the world... Disarmament efforts require insistent public appeals and sustained pressure. A new generation of brave voices, interested students and willing teachers is needed."

Mr. Terumi Tanaka, representing Nihon Hidankyo, also spoke about the importance of passing on the message to the next generation.

"The average age of the A-bomb survivors is now 85. Ten years from now, there may only be a handful of us able to give testimony as firsthand survivors. From now on, I hope that the next generation will find ways to build on our efforts and develop the movement even further."

These statements emphasize the significance of telling the experiences and wishes of the Hibakusha to the next generation and remind us of the meaning of disarmament and non-proliferation education. Disarmament and nonproliferation education is not merely the transmission of knowledge, but also the cultivation of the next generation's ability to act proactively for peace.

Former UN Secretary-General H.E. Mr. Ban Ki-moon gave a speech at the Middlebury Institute for International Studies at Monterey in 2013 highlighting the imperative of disarmament and nonproliferation education, saying.

"It is easier for students to learn the logic of nuclear deterrence than to learn to discard the myths that keep nuclear weapons in place. Education can also help to refute the claim that nuclear disarmament is utopian."

As these words suggest, I believe that education has the power to actually change the status quo, and I'd devote myself to disarmament education for the younger generation daily, even if it is only in a small way.

Senior Project Manager and Research Associate at the James Martin Center for Nonproliferation Studies at the Middlebury Institute in Monterey

Column 3

On the Occasion of the 80th Period of the Atomic Bombing, I Want to Share the Message with the Next Generation

Keiko Ogura

Today, as usual, Hiroshima Peace Memorial Park is busy with visitors from abroad. I reunited with such people who knew Hiroshima in Oslo.

An email dated September 5 from the Nobel Institute arrived out of the blue. It was a request to speak at the forum on December 11, the day after the December 10 Nobel Peace Prize Ceremony. I was perplexed and could not respond soon because I felt I was disproportionate to attend the high-level event discussing nuclear disarmament. As the announcement of the award-winning Nihon Hidankyo, I got more pressure, and it took courage to decide to attend.

The President of the Norwegian parliament, who visited Japan last February, invited us to the Storting building, the parliament of Norway. We saw a magnificent miniature of the Parliament building right next to the main entrance. "This is intended for elementary school students to have fun to know the government and politics," he said. The group of high school students was touring this beautiful and traditional building. "It is important that the youth learn and feel close to the politics. The real peace comes only when statesmen and NGOs work together," the words of the President touched my heart. The upholstery was wooden which gave me peace and affection.

We went to the junior high school in the suburbs. It was strongly requested by Mr. Frank, the Vice President of Bike for Peace, an NGO, who visited Hiroshima with his son this August. The area around the school building from the car is covered with snow and about 200 children waving flags on either side of the cobblestones in the snow-cleared center. Then, I saw a red carpet beyond it. After the witness testimony in the attendance of the mayor of Oslo, the ambassador of Kazakhstan, and Japan, we handed origami and kamishibai (storytelling with pictures). "Please call for nuclear abolition through this kamishibai." At the end, everyone sang John Lennon's Imagine. Loathing to part with and saying goodbye to the children who said "I never forget today!" or "Abolishing nuclear weapons!" we went straight to the cinema in the city, the last place of the events.

It was on November 24 that we had lunch with the Icelandic Ambassador to Japan and his wife, an Icelandic film director, the Mayor of Hiroshima, and the Director of the Hiroshima Peace Memorial Museum. We mostly talked about "TOUCH," an Icelandic-British co-production filmed on location in Hiroshima. The film illustrates the love between Japanese and Icelandic partners and the fear of radiation caused by atomic bombs. I heard it was released in Japan on January 24, 2025. "It would be wonderful if this film is screened in Oslo in the Noble Peace Prize week. Could you let me speak about "Hiroshima" there then?" When I said at lunch after the test screening in Hiroshima, the ambassador's wife replied "I might be able to do it. I'll take care of it." December 12, it came true to screen the film in the cinema in Oslo amid the Nobel Prize weeks.

After the screening, I could have more than 10 minutes to talk about the fear of nuclear with my actual experiences. Then, the conversation with the audience including the ambassadors, movie directors, and artists in the lobby with a glass of beverage had never stopped. Everyone's desire for peace kept me there as I was worried about the preparation for the flight tomorrow morning. Through several interesting dialogues, I touched with the thoughts of others and recognized my position. It was a busy 5 days but a dense experience for me.

Director of Hiroshima Interpreters for Peace

Column 4

What I Want to Tell the Next Generation of Young People

Dr. Masao Tomonaga, Hibakusha

The Nobel Peace Prize 2024 was awarded to the Japan Confederation of A- and H-Bomb Sufferers Organizations (Nihon Hidankyo). At the award ceremony in Oslo last December 10, Norwegian Nobel Committee Chair, Frydnes praised Hidankyo for its many years of testimony, which helped create the "nuclear taboo" during the Cold War era that began in the 1950s, and at the same time, he appealed to the Hidankyo' s further activities against the ongoing "nuclear threat" in the world today.

As an A-bomb survivor and researcher, I was invited by the Norwegian Nobel Committee to speak at the Nobel Peace Prize Forum on December 11. I reported that the persistence of leukemia and multiple types of cancers caused by Abomb radiation in the Hibakusha, which continues to this day, 80 years later, is called "lifelong persistence" and its scientific mechanism can be explained by the genetic damage to stem cells of various organs on August 6 and 9, 1945. In other words, the "scientific answer" was obtained for the lifelong effects of nuclear weapons on the human body, and I emphasized that this is the fundamental proof of the inhumanity of nuclear weapons.

The forum was attended by eight nuclear

experts, including a Nobel laureate. Their main opinion was that the current state of international security, especially the power of the two international treaties, the NPT and the TPNW, which are political agreements aimed at nuclear abolition, is still inadequate. Despite the contribution of the Hidankyo to the formation of a nuclear taboo, people around the world were shocked by the overt "nuclear threat" of Vladimir Putin, who brandished the "possibility of using nuclear weapons" as Russia, a nuclear weapons state, started invading Ukraine. After the Nagasaki atomic bombing, the taboo of never using nuclear weapons again has become on the verge of collapse.

The nuclear abolition movement of the Hibakusha of Hiroshima and Nagasaki and their generation of global citizens around the world was a solid driving force until the passage of the NPT and the TPNW and was able to advance nuclear disarmament to its current level. Now that is rapidly deteriorating. How can we rehabilitate the nuclear abolition movement in the future? It will need to change the knowledge structure of the leaders of the nuclear weapon states and political leadership with a new sense of ethics. The leaders of the nuclear weapons states have always insisted on the safety and preservation of the lives of people in their countries for the reason of possessing and maintaining nuclear weapons. It is the way of thinking that it is our duty to hold the equivalent since their adversaries are armed with nuclear weapons. As long as this nuclear

deterrence mentality persists, nuclear abolition will never be achieved.

The power to change this lies not with the generation that supports the current leaders of nuclear weapon states, but only with the next generation of young people who will have a whole new way of thinking. Thus, a new generation must emerge that does not need nuclear weapons. If through the solidarity of the world's next generation, governments for a nuclear-free world can be realized and the division between nuclear weapon states can be overcome, humanity will finally be at the starting point of creating a new nuclear-free world.

"Nuclear education" and the "creation of a new Anthropocene for mankind" on a global scale are essential to producing such a generation. We, the hibakusha generation, are now average over 85 years of age but some of us still have spare time. Hibakusha, capable enough of talking about the nuclear threat, sharing their experiences of the atomic bombings, and educating the society, must respond to the Norwegian Nobel Committee's call. And it is the coming generation of young people that will overcome the many SDGs' conundrums and create a new way of life for a new Anthropocene.

This year, the 80th anniversary of the atomic bombing is a starting year for these young people.

Emeritus Professor of the Atomic Bomb Disease Institute of Nagasaki University

Column 5

80 Years Anniversary of the Atomic Bombings from the Perspective of the Younger Generation

Hideo Asano

2025 marks the 80th anniversary of the atomic bombings. Eighty years have passed since the events of Hiroshima and Nagasaki. Nevertheless, what we are witnessing today is not a 'world free of nuclear weapons' but a new 'nuclear crisis.'

As of writing, there is no prospect of an end to Russia's invasion of Ukraine. President Vladimir Putin has repeatedly made statements that could be taken as nuclear threats and has also changed the nuclear doctrine, which could be seen as lowering the threshold for the use of nuclear weapons. In the context of the armed conflict in Gaza, the statements by Israeli ministers and US Congressmen on the atomic bombing led to a great deal of criticism. In East Asia, too, the confrontations on the Korean Peninsula and between the US and China are deeprooted, and the nuclear threat casts a shadow over the region. In light of such circumstances, UN Secretary-General Guterres warned that 'We are at the highest risk in decades of a nuclear war.'

At the same time, the world stands on the brink of a nuclear arms race since the Cold War era. The number of active nuclear warheads in the world as of June 2024 is estimated to be 9,583, an increase of 332 warheads since 2018. The New START Treaty, the only remaining treaty between the U.S. and Russia, is due to expire in February 2026, and negotiations on its replacement have not progressed. China, which has been rapidly expanding its nuclear arsenal in recent years, is not even in a similar nuclear arms control regime. Some say that these three countries may resume nuclear tests. Under these circumstances, many experts warn of the possibility of a nuclear arms race between the nuclear weapon states, resulting in a sharp increase in the number of deployed nuclear weapons in the world. Meanwhile, it was reported that approximately 91.4 billion USD (over 13 trillion Japanese yen) was spent worldwide on the production and maintenance of nuclear weapons in 2023 alone.

This worsening situation in the world, particularly the deteriorating regional security environment, has led to discussions on nuclear sharing and the review of the Three Non-Nuclear Principles as a subject of political contention in Japan.

Such a reality weighs heavily on us, the generation that will live the next 80 years. Are we, too, on the verge of nuclear war? Must we live in a world alongside tens of thousands of nuclear weapons? Should we continue to spend trillions of dollars on nuclear weapons while neglecting the livelihoods of each and every citizen?

At the same time, there are new developments to achieve a 'world without nuclear weapons', even in difficult times. At the first-ever UN Summit of the

Future, a 'Pact for the Future' was adopted, which includes an action item, 'we will advance the goal of the goal of a world free of nuclear weapons.' The UN General Assembly adopted a resolution calling for the establishment of the Scientific Panel on the Effects of Nuclear War, and an initiative to comprehensively and objectively identify the possible inhumane global consequences of the use of nuclear weapons has been launched internationally. In the lead-up to the third meeting of the Treaty on the Prohibition of Nuclear Weapons, concrete discussions are underway on the establishment of an international trust fund to assist nuclear victims and on security concerns regarding nuclear deterrence policy. Japanese civil society is also strengthening its movement calling for nuclear abolition that transcends party affiliation and generation, including the launch of the Japan Campaign to Abolish Nuclear Weapons.

Amid this situation, awarding the Nobel Peace Prize to the Nihon Hidankyo gave hope to all those working for a 'world free of nuclear weapons.' The speech by cochair Terumi Tanaka on receiving the award was inspiring and encouraging to many, as well as showing his strong determination to continue pursuing the still unachieved objectives of state compensation for the damage caused by atomic bombing and the abolition of nuclear weapons. In the wake of the Nobel Peace Prize award, one Hibakusha said, "We must fight against war and nuclear weapons together to survive. Passionate about one's actions, rather than

leaving it to others and leaders." No matter how difficult the times were, the Hibakusha have continued their grassroots efforts, refusing to give up. We must carry on the 'hope' and 'passion' that continue in our veins and never let them die out.

Eighty years have passed since the atomic bombings. The question is how to seize this golden opportunity and make the most of it. Whether we can create a turning point from the nuclear crisis to the nuclear disarmament era depends on the actions of each and every one of us.

Secretariat Staff of the Japan Campaign to Abolish Nuclear Weapons

80 Years Anniversary of the Atomic Bombings from the Perspective of the Younger Generation

Himari Ideno

It will be eighty years in 2025 since the atomic bomb was dropped on Hiroshima. I feel how Hiroshima, which became a burnt field, as expressed in "Nothing Will Grow for 70 Years," has revived in 80 years. At the same time, I am concerned that the memories fade away as they get the past. However, "Hiroshima" has had more attention from domestically and abroad recently since the 49th G7 summit in Hiroshima was held and the Nihon Hidankyo was awarded the Nobel Peace Prize. I have committed to the treeplanting ceremony of the G7 summit, the junior conference, and the Youth Caravan until now. Then, I volunteer at the Hiroshima Peace Memorial Park to guide foreign visitors. One of the reasons that I continue activities is we are the "last generation" to listen to the testimony directly from Hibakusya. My conduct stems from what I can do to make the world without nuclear weapons as the "last generation."

It is difficult to say today's world is peaceful when we look around. Wars and conflicts involving civilians around the world have never stopped such as Russia's invasion of Ukraine in 2022, the Sudan civil war, and the war in Gaza. In the case of the Russian invasion of Ukraine, there is no sign of a solution despite it has been more than two years. In this global situation, the number of nuclear arms declined in January 2024 compared to 2023 (Hiroshima Organization for Global Peace, 2024)⁸, but the fact is that it was only due to the retirement of outdated warheads by the U.S. and Russia. The number of operational nuclear warheads has increased and disarmament has got stuck. According to the Doomsday Clock operated by the Bulletin of the Atomic Scientists in the United States, 2024 marks '90 seconds left' until the end of humanity (Bulletin of the Atomic Scientists, 2024)⁹. This is the shortest ever for the second year in a row. It was based on the fact that the war in Ukraine, with Russia implicating the use of nuclear weapons, was the closest the world has ever come to destruction and that humanity still faces a crisis this year. The NPT, one of the international efforts, failed to adopt the Final Document in the last two conferences.

What can we, the youth, do in this situation? I think positive peace that creates peace in the social structure to achieve a peaceful future without nuclear weapons is essential. We cannot make the world without nuclear weapons alone.

⁸ Hiroshima Peace Building Promotion Council. (n.d.). Nuclear Weapons 2024. Retrieved December 12, 2024, from https://hiroshimaforpeace.com/nuclearweapon2024/.

⁹ Bulletin of the Atomic Scientists. (n.d.). Doomsday Clock: Current Time. Retrieved December 12, 2024, from https://thebulletin.org/doomsday-clock/current-time/.

First, it is about trying to understand what is happening in the world, trying to understand others, and consistently engaging in dialogue. I believe that listening to others and trying to understand them is the first step towards building a peaceful future that each of us can take. Many young people are taking further action from this step. Today, many of them, including the peace organization based on the youth or those who try to become the successor of personal witness statements of the survivors, take action to deliver the voice of the Hibakusya in the future and make a peaceful world without nuclear weapons. The abolishment of nuclear weapons and the creation of a peaceful world are not issues that are accomplished overnight. However, I think that we, carriers and creators of the future, must take action for a peaceful world.

Freshman, Hiroshima Universi

Chapter 1

Nuclear Disarmament¹

(1) Status of Nuclear Forces (estimates)

As of December 2024, eight countries have declared that they possess nuclear weapons. According to Article IX-3 of the Nuclear Non-Proliferation Treaty (NPT), "a nuclear-weapon State [NWS] is one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967." China, France, Russia, the United Kingdom, and the United States meet this requirement and have acceded to the NPT as NWS as defined by the treaty. The three other countries that have tested nuclear weapons and declared possessing them are India, Pakistan, and North Korea. India and Pakistan have never been parties to the NPT. Israel, a non-NPT

state, has maintained a policy of "nuclear ambiguity" by neither confirming nor denying having nuclear weapons, although it is widely believed that it possesses them. There is no conclusive evidence that Israel has conducted a nuclear explosive test. In 2003, North Korea declared its withdrawal from the NPT and, subsequently, its acquisition of nuclear weapons. In this report, these four additional states that have publicly declared possession of or are believed to possess nuclear weapons are referred to as "other nuclear-armed states."

The total number of nuclear weapons in the world, which grew to approximately 70,000 at the peak of the Cold War era, has been significantly reduced since the late 1980s. However, as of January 2024, according to the estimates by the Stockholm International Peace Research Institute (SIPRI), 12,121 nuclear weapons (including those awaiting dismantlement)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
China	250	260	260	270	280	290	320	350	350	410	500
France	300	300	300	300	300	300	290	290	290	290	290
Russia	8,000	7,500	7,290	7,000	6,850	6,500	6,375	6,255	5,977	5,889	5580
U.K.	225	215	215	215	215	200	195-215	225	225	225	225
U.S.	7,300	7,260	7,000	6,800	6,450	6,185	5,800	5,550	5,428	5,244	5,044
India	90-110	90-110	100-120	120-130	130-140	130-140	150	156	160	164	172
Pakistan	100-120	100-120	100-130	130-140	140-150	150-160	160	165	165	170	170
Israel	80	80	80	80	80	80-90	90	90	90	90	90
N. Korea ^(a)	(6-8)	(6-8)	(10)	(10-20)	(10-20)	(20-30)	(30-40)	(40-50)	20	30	50
Total ^(b)	16,350	15,850	15,395	14,935	14,465	13,865	13,400	13,080	12,705	12,512	12,121

Table 1-1: Number of nuclear weapons-2014-2024

(a) Respective estimates from 2014-2021 list the number of warheads which North Korea could potentially build with the amount of fissile material it has produced.

(b) Respective total amounts from 2014-2021 do not include the number of warheads which North Korea could potentially possess.

Sources: Stockholm International Peace Research Institute (SIPRI), SIPRI Yearbook: Armaments, Disarmament and International Security (Oxford: Oxford University Press).

¹ This chapter is authored by Mao Takahata and Hirofumi Tosaki.

	Total nuclear stockpile			Nuclear warheads	Delivery vehicles		
U.S.	5,044	Retired / Awaiting dismantlement 1,336					
		Operational	Non-deployed				
		3,708	1,938				
			Deployed 1,770	Non-strategic 200			
				Strategic	ICBM	800	400
				3,508	SLBM	1,920	280
					Strategic bomber	788	66
Russia	5,889	Retired / Awaiting dismantlement 1,200					
		Operational	Non-deployed				
		4,380	2,670				
			Deployed	Non-strategic			
			1,710	1,558			
				Strategic	ICBM	1,244	329
				2,822	SLBM	992	192
					Strategic bomber	586	67
U.K.	225		Deployed		SLBM	120	64
F	200		120				
France	290		Deployed		SLBM	240	64
01.	500		280		carrier based aircraft)	50	50
China	500				Land-based ballistic missile	346	350
					SLBM	72	72
					Attack aircraft	20	20
T 1'	174				Other stockpile	62	
India	104				Land-based missile	80	80
					Attack aircraft	48	84
					SLBM	16	14
Dalaistan	170				Other stockpile	28	
Pakistan	1/0				Land-based ballistic missile	126	126
					Attack aircraft	36	36
Israal	90				Other stockpile	8	50
israei	20				Ballistic missile	50	50
					Attack aircraft	50 10	50 20
N. Korea	59				Gruise missue	10	20
Would	12 121						
woria	12,121		(Deployed)				

Table 1-2: Status of nuclear forces (estimates, as of January 2024)

ICBM: Inter-Continental Ballistic Missile SLBM: Submarine Launched Ballistic Missile

(3,904)

Source: SIPRI, SIPRI Yearbook 2024, chapter 10.

still exist on the Earth, with the U.S. and Russian nuclear stockpiles together constituting approximately 90% of the total. This amount includes retired warheads; if these are excluded, the number of nuclear warheads (military stockpiles) in the world has increased from 9,576 in the previous year to 9,585. In addition, the number of nuclear warheads deployed with operational forces has also increased from 3,844 in the previous year to 3,904.² Furthermore, all nuclear-weapon states have been actively pursuing the modernization of their nuclear forces and emphasizing the role of nuclear weapons in their security strategies. Both qualitatively and quantitatively, we have already entered an era of nuclear arms race.

Of the nuclear weapon states, only France and the United Kingdom have announced their maximum number of nuclear weapons. In 2015, France announced that its maximum number of nuclear weapons was 300, that it did not possess any nondeployed nuclear weapons and that all of its nuclear weapons were deployed and operational.³ In its "Integrated Review of Security, Defence, Development and Foreign Policy" published in March 2021, the United Kingdom announced that it would increase its total nuclear arsenal from the previous level of 180 or fewer to 260 or fewer.⁴ Since these statements, neither country has revealed any further details about its nuclear weapons stockpiles.

In recent years, the pace of increase in China's nuclear warheads has accelerated and SIPRI has estimated that the number increased by 90 warheads from 2023 to 2024. It is also estimated that the number of nuclear warheads in India and Pakistan has gradually increased by around 10 warheads per year over the past few years. North Korea is also strengthening its nuclear capabilities in terms of both quality and quantity. In a speech delivered on September 9, 2024, marking the 76th anniversary of the country's founding, Kim Jong Un, North Korea's supreme leader, stated: "We are now perfectly carrying out the policy by building the nuclear armed forces on increasing the number of nuclear weapons by geometrical progression."⁵ A specialist from a U.S. research organization gave the following estimate: "North Korea may have produced enough fissile material to hypothetically build up to 90 nuclear warheads, but has likely assembled fewer than that—potentially around 50."6

Pranay Vaddi, Special Assistant to the President and Senior Director for Arms Control, Disarmament, and Non-Proliferation at the U.S. National Security Council, said on June 7 that "[W]e do not need to increase our nuclear forces to

² Stockholm International Peace Research Institute, *SIPRI Yearbook 2024: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 2024), chapter 7.

³ NPT/CONF.2015/10, March 12, 2015.

⁴ United Kingdom, *Global Britain in a Competitive Age: The Integrated Review of Security, Defence, Development and Foreign Policy*, March 2021, p. 76.

⁵ "Respected Comrade Kim Jong Un Makes Important Speech on National Day," *KCNA*, September 10, 2024, http://www.kcna.co.jp/item/2024/202409/news10/20240910-02ee.html.

⁶ Hans M. Kristensen, Matt Korda, Eliana Johns and Mackenzie Knight, "North Korean Nuclear Weapons, 2024," *Bulletin of the Atomic Scientists*, July 15, 2024, https://thebulletin.org/premium/2024-07/north-korean-nuclear-weapons-2024/.

match or outnumber the combined total of our competitors to successfully deter them." He added: "Absent a change in the trajectory of adversary arsenals, we may reach a point in the coming years where an increase from current deployed numbers is required."⁷

(2) Commitment to Achieving a World without Nuclear Weapons

A) Approaches toward a world without nuclear weapons

According to the preamble of the NPT, states parties "[declare] their intention to achieve at the earliest possible date the cessation of the nuclear arms race and to undertake effective measures in the direction of nuclear disarmament, [and urge] the co-operation of all States in the attainment of this objective." Article VI of the Treaty stipulates that "[e]ach of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control."

No country openly opposes the goal of the total elimination of nuclear weapons or the vision of a world without nuclear weapons. Commitment to nuclear disarmament has been reiterated in various fora, including the NPT review process and the UN General Assembly (UNGA). However, such a "commitment" does not necessarily mean that NWS and nuclear-armed states are actively pursuing the realization of a world without nuclear weapons. In the wake of the recent intensification of strategic competition, as well as Russia's invasion of Ukraine accompanied by nuclear intimidation since 2022, NWS have reemphasized the role of nuclear weapons in their national security, and there have been few proactive efforts toward nuclear disarmament.

Nuclear-weapon states

Nuclear weapon states have expressed their continued commitment to the NPT and have stated that they will take a realistic, step-by-step approach to nuclear disarmament. In the context of the NPT, the five nuclear-weapon states have been cooperating to a certain extent on nuclear disarmament issues by holding regular meetings and issuing joint statements at the NPT Review Conference and Preparatory Committee meetings. Although P5 meetings have temporarily stalled since Russia's full-scale invasion of Ukraine in February 2022, it was reported that a working group of the five nuclear weapons states chaired by Russia was held in Saudi Arabia in February 2024.8 Another meeting of experts was held in Dubai in December.9

⁷ "Adapting the U.S. Approach to Arms Control and Nonproliferation to a New Era. Remarks from Pranay Vaddi," *Arms Control Association*, June 7, 2024, https://www.armscontrol.org/2024Annual Meeting/Pranay-Vaddi-remarks.

⁸ "Working Meeting of Five Nuclear Powers Held in Saudi Arabia on February 29," *TASS*, March 4, 2024, https://tass.com/politics/1755335.

^{9 &}quot;FM Spokesperson: China Supports Discussions of 5 Nuclear-Weapon States Mechanism," Xinhua,

However, as with the 10th NPT Review Conference in 2022 and the First Preparatory Committee for the 11th NPT Review Conference (hereafter, NPT Preparatory Committee) in 2023, the five nuclear-weapon states did not issue a joint statement at the Second NPT Preparatory Committee in July-August 2024, demonstrating once again the seriousness of the rift among the nuclear weapon states.

At the second NPT PrepCom, a Chair's Summary was produced as a working document, but the following note was inserted due to a Russian objection: "The working document reflects the views of the Chair only. It has not been agreed to by the delegations and does not reflect the full range of views of the delegations. It should not be considered as a basis for the future NPT Review Process."¹⁰

At the second NPT PrepCom, the nuclear weapon states made the following statements about their approach to nuclear disarmament. China stated that it is "willing to enhance the P5's communication and cooperation on issues of upholding the NPT regime. We are also willing to work for fruitful outcomes of this round of the review process, and to jointly uphold the universality, authority and effectiveness of the NPT."11 China proposed to foster a correct security vision and pursue common security; uphold the consensus on nuclear disarmament; and strengthen cooperation in a rational and pragmatic manner to reduce strategic risks. Also, on the occasion of the 60th anniversary of China's first nuclear test, the Ministry of Foreign Affairs' Deputy Director of the Press and Information Department, Mao Ning, said at a press conference that China is willing to work with all parties to continue efforts towards the complete prohibition and thorough destruction of nuclear weapons and achieving the goal of a world free of nuclear weapons.¹²

France made a reference to the P5 declaration adopted in January 2022, stating that "[it] recalls that nuclear weapons, as long as they exist, must be used for defensive purposes, deterrence and the prevention of war"¹³ and emphasized its support for a balanced approach to the implementation of Article XI.

Russia stated that "the NPT remains a central element of the international security system. The Treaty is still effective and has proven its resilience and

December 11, 2024, http://english.scio.gov.cn/pressroom/2024-12/11/content_117600140.html.

¹⁰ At the first PrepCom, Iran prevented the adoption of the conference report itself, and the Chair's Summary was removed from the list before adoption. As a result, diplomatic efforts were made during the second PrepCom to adopt the Chair's Summary by consensus, giving it a document number and including it in the list of conference documents.

¹¹ "Statement by China," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.

¹² "China to Work with All Parties to Achieve Goal of Nuclear Weapon-Free World: Spokesperson," *Xinhua*, October 16, 2024, https://english.news.cn/20241016/34dfac8fe3eb44c2bbb99c06d20c949a/c.html.

¹³ "Statement by France," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

usefulness to all its parties."¹⁴ Russia "has consistently maintained that it is necessary to rely on the approaches that have no alternative and that have been enshrined in the provisions of the NPT and the consensus documents of the NPT review process. Their key clauses stipulate that nuclear disarmament should be considered as an integral part of the process of general and complete disarmament and that steps leading to nuclear disarmament should promote international peace and stability and be based on the principle of increased and undiminished security for all."15 However, Russia also insisted that it "remains convinced that no idea on achieving progress in nuclear disarmament formulated without regard to the international security situation, can be either pragmatic, or workable. Without taking collective efforts to remedy the grave situation in global affairs and creating favorable climate for disarmament first, no tangible progress towards nuclear zero can be attained."16

The United Kingdom stated that "[t]he NPT provides the only credible and sustainable route to multilateral nuclear disarmament. It has created the nonproliferation framework that has both limited the spread of nuclear weapons and enabled safe access to nuclear technologies for peaceful uses. As a Government that believes in the rule of law at home and internationally, the United Kingdom remains as committed to its full implementation and universalization."¹⁷

While the United States reaffirmed its commitment to the goals of the NPT and has taken significant steps to implement article VI, it stated that "in contrast to our positive approach and longstanding efforts to manage rivalry and unrestrained competition through arms control, the outright refusal of Russia and the PRC [People's Republic of China] to even discuss arms control at this time obliges the United States and our close allies and partners to prepare for a world of nuclear competition without numerical constraints. In such a world, the United States might have to reconsider its capabilities and posture to account for the threats posed by Russia and the PRC. Such a step would not reflect an abandonment of our principles or commitment to pursuing the shared goal of a world without nuclear weapons. But we cannot ignore the current security environment in which Russia, the PRC, and the DPRK [Democratic People's Republic of Korea] are all expanding and diversifying their arsenals at breakneck pace. That is why we need your collective voices in demanding that all these countries engage in nuclear risk reduction

¹⁴ "Statement by Russia," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 25, 2024.

 ¹⁵ "Statement by Russia," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.
¹⁶ Ibid.

¹⁷ "Statement by the United Kingdom," General Debate, Second PrepCom for the 11th NPT RevCon, July 24, 2024.

efforts without further delay."18

The initiative entitled "Creating an Environment for Nuclear Disarmament" (CEND), launched by the United States in 2019 and involving 43 countries (including nuclear-weapon states, non-nuclearweapon states, non-signatories to the NPT, Non-Aligned Movement [NAM] countries, U.S. allies, signatories to the Treaty on the Prohibition of Nuclear Weapons [TPNW]...), concluded one its major tasks, the "Interim Measures to Reduce the Risks associated with Nuclear Weapons", at the CEND meeting held in Berlin from 27-29 May 2024.19 A "Conclusions" text reflected a summary of the discussions while two compendia (compendium No. I and II) reflected in detail the work on the issue. The texts included wide areas of convergence, in particular:20

- As states aim to achieve a world free of nuclear weapons, it will be necessary to pursue interim measures to enhance security and reduce all risks associated with nuclear weapons, as appropriate, and the likelihood of nuclear weapons use.
- Nuclear risk reduction is neither a substitute nor a prerequisite for nuclear disarmament and efforts in this area could, without conditionality,

contribute to forward movement related to nuclear disarmament commitments.

- Deep concerns about nuclear risks between nuclear-armed states and towards non-nuclear-armed states, have been a long-standing item on the agenda of relevant fora for nuclear arms control, disarmament, and nonproliferation.
- \geq In the light of a deteriorating international security environment, including the continued or increased salience of nuclear weapons in the respective security policies and the lack of progress concerning disarmament obligations, as well as the development and deployment of new offensive and defensive weapons systems, there is an urgent need to promote discussions on risks of nuclear weapons use between nuclear-armed states and with nonnuclear-armed states and other States concerned, to foster understanding between diverging views.

The CEND discussion endeavored to address and identify nuclear risk reduction measures in a systematic way, distinguishing in particular:²¹

 Political-doctrinal measures: commitments regarding decreasing the role of nuclear weapons in doctrines

¹⁸ "Statement by the United States," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

¹⁹ "CEND Subgroup 3 on Interim Measures to Reduce the Risks Associated with Nuclear Weapons," U.S. Department of State, June 6, 2024, https://www.state.gov/cend-subgroup-3-on-interim-measures-to-reduce-the-risks-associated-with-nuclear-weapons/.

²⁰ "CEND Subgroup 3 Interim Measures to Reduce the Risks Associated with Nuclear Weapons, Conclusions," U.S. Department of State, June 7, 2024, https://www.state.gov/wp-content/uploads /2024/06/240529-Conclusions-consolidated.pdf.

²¹ Ibid.

and security policies, and limiting the circumstances under which these weapons may be used (e.g. no first use; non-use against non-nuclear-armed states; strictly defensive purposes) including transparency on these measures;

- Strategic measures: changes in the deployment of nuclear weapons, including reductions, restrictions, and increased protection of nuclear weapons systems;
- Operational measures: changes in operational procedures, including launch, storage, and transport procedures, as well as commitments regarding de-targeting and de-alerting of nuclear weapons, and preventing unauthorized access to nuclear weapons, related materials, equipment and technology;
- Confidence and security building measures: increased dialogue, information exchange and transparency regarding nuclear weapons;
- Crisis and conflict prevention and management measures: improving crisis and conflict prevention and management mechanisms, in particular communication channels, to prevent any situation escalating towards potential nuclear levels. Crises management should be complementary to crisis prevention.

Nuclear-weapon states outside the NPT have stated their commitment to nuclear disarmament and outlined their specific approaches at the UN General Assembly, its First Committee, and other fora. India stated that its "support for the complete elimination of nuclear weapons is consistent with the highest priority to the goal of nuclear disarmament agreed by consensus in the Final Document of the First Special Session of the General Assembly (SSOD-I). As a nuclear weapon state [sic], our commitment to universal, non-discriminatory and verifiable nuclear disarmament remains undiminished. This goal can be achieved by a step-by-step process underwritten by a universal commitment and an agreed multilateral framework that is global and nondiscriminatory."22 Pakistan made a similar statement, arguing that "[n]uclear disarmament has been a top priority of the international community since at least 1946" and that "Pakistan remains committed to the goal of a nuclearweapons-free world, that is achieved in a universal, verifiable and nondiscriminatory manner. This goal can be best advanced by implementation of the cardinal principles of SSOD-I, i.e. the primary responsibility of military significant states, the pursuit of disarmament measures in an equitable and balanced manner to ensure that no individual or a group of states obtain advantages over others at any stage, and undiminished security at the lowest possible level of armaments. Towards this end, Pakistan reiterates its call for negotiation of a comprehensive nuclear weapons convention without further

²² "Statement by India," Thematic Debate on Nuclear Weapons, First Committee, UNGA, October 15, 2024.

delay."23

Israel did not mention in its speeches to the UNGA First Committee any policy aimed at achieving a world without nuclear weapons or the abolition of nuclear weapons.

North Korea reiterated its criticism of the United States and its allies and stated that "in order to achieve total elimination of nuclear weapons, those states with the largest nuclear arsenals should take the lead in nuclear disarmament. In particular, the only user of nuclear weapons and the world's largest nuclear weapon state U.S. should renounce the nuclear policy of designating sovereign nations as enemy states and placing them on the list of preemptive nuclear strike, and refrain from sharing nuclear weapons with and proliferating nuclear technology to its allies. In order to ensure peace on the Korean peninsula, the United States must fundamentally remove military threats against the DPRK, including through immediate halt to the joint military exercises with the ROK mobilizing nuclear assets, and arms build-up as well as dissolution of the "UN Command."24

<u>NNWS</u>

The majority of non-nuclear-weapon states (NNWS) expressed their concerns about the worsening international security environment, including the situation in Ukraine, the Israel-Gaza conflict, U.S.- China competition, and North Korea's nuclear development, all of which hinder progress in the implementation of the NPT. They have also criticized the stagnation and regression of nuclear disarmament and called for the revitalization of disarmament efforts toward a world without nuclear weapons.

At the NPT PrepCom in 2024, the New Agenda Coalition (NAC: Brazil, Egypt, Ireland, Mexico, New Zealand and South Africa) stated that "[d]espite some initial progress since the NPT's indefinite extension in 1995 it is deeply troubling how little progress toward nuclear disarmament has been achieved, despite the unequivocal undertaking by the nuclear-weapon states, to accomplish the total elimination of their nuclear arsenals. We take this opportunity to remind the nuclear weapon states of their obligations under the NPT, and to reaffirm that the Treaty was never intended to create a permanent entitlement for some to retain nuclear weapons."25

Sweden stated that "if we are to achieve our common goal of a world free from nuclear weapons, multilateralism is our best chance. But faith in multilateralism is built on progress. This goes for the NPT as well. In order to uphold and strengthen this regime, we must see concrete progress. NPT obligations and commitments remain valid and should be

²³ "Statement by Pakistan," Thematic Debate on Nuclear Weapons, First Committee, UNGA, October 21, 2024.

²⁴ "Statement by North Korea," Thematic Debate on Nuclear Weapons, First Committee, UNGA, October 16, 2024.

²⁵ "Statement by NAC," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

fully implemented. Nuclear Weapon States bear a special responsibility, but all states can help drive progress forward."²⁶

Among the TPNW-promoting countries, Austria stated that "[the TPNW] is a significant engagement in and expression of support for the nuclear disarmament and non-proliferation regime by its supporters and, more broadly, and investment into multilateralism, international law and international peace and security. It strengthens the nuclear regime and supports the NPT on both, its disarmament and non-proliferation pillars."27 South Africa also contended that the "TPNW is premised on the fundamental principle of humanity and the ethical imperatives for nuclear disarmament. The TPNW is gaining growing support for humanitarian efforts to take action against the existence of nuclear weapons and the TPNW's pertinence and relevance for Article VI and the NPT cannot be overemphasized."28 Kazakhstan expressed the same view.

Among the NNWS allied with the United States, Japan stated its position on the three pillars of the NPT, highlighting the importance of the non-use of nuclear weapons, the immediate start of a Fissile Material Cut-Off Treaty (FMCT) negotiations, and the early entry into force of the Comprehensive Nuclear-Test-Ban Treaty (CTBT).²⁹ Japan reiterated the need "to promote realistic and practical measures under the Hiroshima Action Plan."³⁰ In addition, the joint statement issued at the Japan-U.S. Summit Meeting in April 2024 declared that "[t]he United States and Japan are resolved to achieve a world without nuclear weapons through realistic and pragmatic approaches. [...] We reaffirm the importance of upholding the [NPT] as the cornerstone of the global nuclear disarmament and nonproliferation regime and for the pursuit of peaceful uses of nuclear energy."31

Germany explained that it "will remain engaged in bridgebuilding initiatives such as the Stockholm Initiative, the Non-Proliferation and Disarmament Initiative (NPDI) or the International Partnership for Nuclear Disarmament Verification (IPNDV), aimed at reducing nuclear risks, improving the framework for nuclear disarmament or preparing concepts and methods to verify nuclear disarmament."³²

Canada reaffirmed "the Treaty's pivotal role in curbing nuclear proliferation,

²⁶ "Statement by Sweden," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

²⁷ "Statement by Austria," General Debate, Second PrepCom for the 11th NPT RevCom, July 22, 2024.

²⁸ "Statement by South Africa," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

 ²⁹ "Statement by Japan," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.
³⁰ Ibid.

³¹ "United States-Japan Joint Leaders' Statement: Global Partners for the Future," Washington, D.C., April 10, 2024, https://www.whitehouse.gov/briefing-room/statements-releases/2024/04/10/united-states-japan-joint-leaders-statement/.

³² "Statement by Germany," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.

promoting peaceful uses of nuclear energy, and advancing disarmament. It is crucial that we sustain the NPT as a robust and effective instrument and continue to strive to achieve its goals. Canada recognizes the challenges facing the NPT and its operational framework. The ongoing quest for security through disarmament persists amid a fast-changing global security landscape, demanding adaptation and increased effectiveness."³³

Switzerland stated that "progress is needed in three areas": "forward movement on practical disarmament measures, with a view to implementing commitments under the NPT; [...] practical steps to reduce nuclear risks and the likelihood of a nuclear war", calling for restraint; "results in strengthening transparency and accountability for monitoring progress in the implementation of NPT Article VI and related commitments."34At the NPT PrepCom, many NNWS were highly critical of the current state of nuclear disarmament. For instance, the NAM expressed "deep concern over continued lack of progress in the implementation of nuclear disarmament obligations by the NWS. NWS must pursue the full and effective implementation of their obligations under Article VI as well as

Decision 2 of 1995 the 13 practical steps agreed in the Final Document of the 2000 Review Conference, Particularly the unequivocal undertaking by the NWS to accomplish the goal of total elimination of Nuclear weapons, and the action plan on nuclear disarmament agreed in the 2010 review conference."35 South Africa affirmed that "the credibility and longevity of the NPT and its review process is at stake. It is therefore imperative for this Preparatory Committee and the 11th Review Conference to advance genuine efforts on nuclear disarmament, with enhanced accountability and transparency, including clearly defined benchmarks and timelines."36

B) Voting behavior on UNGA resolutions on nuclear disarmament proposals by Japan, NAC and NAM

In 2024, the UNGA once again adopted the following three resolutions: "Steps to building a common roadmap towards a world without nuclear weapons"³⁷ proposed by Japan and others; "Towards a nuclear-weapon-free world: accelerating the implementation of nuclear disarmament commitments"³⁸ proposed by the

³³ "Statement by Canada," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

³⁴ "Statement by Switzerland," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.

³⁵ "General Reflection by NAM to NPT on the Draft Factual Summary of the Second Session of the Prep Com for the 11th NPT RevCon," Second PrepCom for the 11th NPT RevCon, August 2, 2024.

³⁶ "Statement by South Africa," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

³⁷ A/RES/79/41, December 2, 2024.

³⁸ A/RES/79/35, December 2, 2024.

New Agenda Coalition (NAC); and "Nuclear disarmament"³⁹ proposed by NAM members. The voting behavior of the countries surveyed in this project on these three documents is presented below.

- "Steps to building a common roadmap towards a world without nuclear weapons"—152 in favor (Australia, Canada, Germany, Japan, Kazakhstan, South Korea, Mexico, Netherlands, Norway, Poland, Saudi Arabia, Sweden, Switzerland, Turkey, United Kingdom, United States and others); 6 against (China, Iran, North Korea, Russia, Syria and other); 28 abstentions (Austria, Brazil, Egypt, France, India, Indonesia, Israel, New Zealand, Pakistan, South Africa and others)
- "Towards a nuclear-weapon-free world: accelerating the implementation of nuclear disarmament commitments"— 137 in favor (Austria, Brazil, Egypt, Indonesia, Iran, Kazakhstan, Mexico, New Zealand, Saudi Arabia, South Africa, Switzerland, Syria and others); 35 against (Canada, France, Germany, India, Israel, North Korea, South Korea, Norway, Netherlands, Poland, Russia, Sweden, Turkey, United Kingdom, United States and others); 15 abstentions (Australia, China, Japan, Pakistan, and others)
- "Nuclear disarmament"—120 in favor (Brazil, China, Egypt, Indonesia, Iran, Kazakhstan, Mexico, Saudi Arabia,

Syria and others); 43 against (Australia, Canada, France, Germany, Israel, South Korea, Netherlands, Norway, Poland, Russia, Sweden, Switzerland, Turkey, United Kingdom, United States and others); 20 abstentions (Austria, India, Japan, North Korea, New Zealand, Pakistan, South Africa and others)

The resolution on the abolition of nuclear weapons, submitted by Japan and adopted by the UNGA, was almost identical to the previous year's resolution, with the notable addition of the Japan Confederation of A- and H-Bomb Sufferers Organizations (Nihon Hidankyo) receiving the Nobel Peace Prize in 2024. "Cognizant of the need to present a way forward for realistic and practical measures to achieve a world without nuclear weapons, the Government of Japan calls on the implementation of concrete measures based on "Hiroshima Action Plan," presented by Japan, including the continuation of the non-use of nuclear weapons, enhancement of transparency measures, the early start of negotiations on an FMCT as well as disarmament and non-proliferation education to improve understanding of the realities of the atomic bombings, taking into account maintaining and strengthening the NPT, the cornerstone of the global nuclear non-proliferation and disarmament architecture."⁴⁰ As in the previous year's

³⁹ A/RES/79/50, December 2, 2024.

⁴⁰ "Adoption of the Draft Resolution on the Elimination of Nuclear Weapons Submitted by Japan to the First Committee of the United Nations General Assembly (Statement by Foreign Minister Iwaya Takeshi)," Ministry of Foreign Affairs of Japan, November 2, 2024, https://www.mofa.go.jp/press /statement/pressite_000001_00704.html.

	Joint courses of action and future- oriented dialogue towards a world without nuclear weapons	Towards a nuclear weapon- free world	Nuclear disarmament	TPNW	Follow-up to the advisory opinion of the ICJ	Convention on the Prohibition of the Use of Nuclear Weapons	Humanitarian consequences	Ethical
China	×	\bigtriangleup	0	×	0	0	\bigtriangleup	△*)
France	\bigtriangleup	×	×	×	×	×	×	×
Russia	×	×	×	×	×	\bigtriangleup	×	×
U.K.	0	×	×	×	×	×	×	×
U.S.	0	×	×	×	×	×	×	×
India	\bigtriangleup	×	\bigtriangleup	×	\bigtriangleup	0	0	\bigtriangleup
Israel	\bigtriangleup	×	×	×	×	×	×	×
Pakistan	\bigtriangleup	\bigtriangleup	\bigtriangleup	×	$\triangle^{*)}$	\bigtriangleup	\bigtriangleup	\bigtriangleup
Australia	0	\bigtriangleup	×	\bigtriangleup	×	×	\bigtriangleup	×
Austria	\bigtriangleup	0	\bigtriangleup	0	0	×	0	0
Brazil	\bigtriangleup	0	0	0	0	\bigtriangleup	0	0
Canada	0	$\times^{*)}$	×	×	\bigtriangleup	×	\bigtriangleup	×
Egypt	\bigtriangleup	0	0	0	0	0	0	0
Germany	0	$\times^{\ast)}$	×	×	×	×	\bigtriangleup	×
Indonesia	\bigtriangleup	0	0	0	0	0	0	0
Iran	×	0	0	0	0	0	0	0
Japan	0	\bigtriangleup	\bigtriangleup	×	\bigtriangleup	\bigtriangleup	0	\bigtriangleup
Kazakhstan	0	0	0	0	0	0	0	0
South Korea	0	$\times^{*)}$	×	×	×	×	\bigtriangleup	×
Mexico	0	0	0	0	0	0	0	0
Netherlands	0	$\times^{*)}$	×	×	\bigtriangleup	×	\bigtriangleup	×
New Zealand	\bigtriangleup	0	\bigtriangleup	0	0	×	0	0
Norway	0	$\times^{\ast)}$	×	×	\bigtriangleup	×	\bigtriangleup	×
Poland	0	×	×	×	×	×	×	×
Saudi Arabia	○*)	0	0	\bigtriangleup	0	○*)	0	0
South Africa	$\triangle^{*)}$	0	\bigtriangleup	0	0	0	0	0
Sweden	0	$\times^{\ast)}$	×	×	×	×	\bigtriangleup	×
Switzerland	0	0	×	\bigtriangleup	0	×	0	\bigtriangleup
Syria	×	0	0	?	0	0	0	0
Turkey	0	×	×	×	×	×	\bigtriangleup	×
North Korea	×	×	\bigtriangleup	×	\bigtriangleup	\bigtriangleup	\bigtriangleup	\bigtriangleup

Table 1-3: Voting behavior on selected UNGA resolutions in 2024

 $[\bigcirc:$ In favor, $\times:$ Against, $\triangle:$ Abstention, ?: No vote]

*) Changing voting behavior in 2024 from the previous year.

resolution, it expressed deep concerns about the devastating and inhuman consequences of the use of nuclear weapons, and encouraged leaders and young people to visit Hiroshima and Nagasaki. It also referenced the TPNW, stating that Japan "takes note" of its entry into force and the holding of the first and second meetings of the Conference of the Parties.

(3) Humanitarian Consequences of Nuclear Weapons

A) Main arguments

At the NPT PrepCom in 2024, a number of NNWS referred to the humanitarian consequences of nuclear weapons. For instance, the NAM countries stated that they remain "extremely concerned at the threat to humanity posed by the continued existence of nuclear weapons and of their possible use or threat of use."41 In their joint statement, the state parties and signatory states to the TPNW stated that "[t]he catastrophic humanitarian consequences and risks associated with nuclear weapons underpin the moral and ethical imperatives for nuclear disarmament and the urgency of achieving and maintaining a nuclearweapon free world, which helped to inspire the creation of the Treaty on the Prohibition of Nuclear Weapons and guide its implementation. These humanitarian considerations should be at the center of all disarmament policies, highlighting the human cost of nuclear weapons and the need to protect human life and the environment."42

The NAC stated that "[a] nuclear war would have catastrophic humanitarian consequences exceeding any State's capacity to respond. Its effects would transcend national borders and have multi-generational effects on human health, with clear gender-specific impacts, and the environment, resulting in a breakdown to the global food supply and the collapse of ecosystems, amongst other devastating impacts."43 The NAC also submitted a working paper emphasizing the catastrophic nature of the humanitarian consequences of nuclear weapons, adding that "[t]he risk of nuclear war has escalated in recent times. Hence, all States parties to the Non-Proliferation Treaty should recognize and restate their grave concern about the catastrophic consequences of any nuclear weapons use and redouble practical efforts to prevent such use. There is a growing body of scientific evidence showing that use of nuclear weapons would have catastrophic humanitarian consequences outside any State's capacity to respond. In addition to the immediate loss of life, these consequences transcend national borders and would include, inter alia, long-term impacts on human health and on the environment; breakdowns in the global food supply, supply chains and financial systems; and the collapse of ecosystems and critical infrastructure."44

At the 2024 UNGA, as in the previous year, countries primarily from the Humanitarian Group submitted a resolution titled "Humanitarian consequences of nuclear weapons."⁴⁵ The resolution,

⁴¹ "Statement by NAM," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

⁴² "Joint Statement by the States Parties and Signatory States to the TPNW," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

⁴³ "Statement by NAC," Cluster1, Second PrepCom for the 11th NPT RevCon, July 24, 2024.

⁴⁴ NPT/CONF.2026/PC.II/WP.2, May 20, 2024.

⁴⁵ A/RES/79/37, December 2, 2024.

inter alia, "[s]tresses that the catastrophic effects of a nuclear weapon detonation [...] cannot be adequately addressed" and called to prevent the use of nuclear weapons and to achieve nuclear disarmament. The voting behavior of countries surveyed in this project on this resolution is as follows:

142 in favor (Austria, Brazil, Egypt, India, Indonesia, Iran, Japan, Kazakhstan, Mexico, New Zealand, Saudi Arabia, South Africa, Switzerland, Syria and others); 11 against (France, Israel, Poland, Russia, the United Kingdom, the United States and others); 34 abstentions (Australia, Canada, China, Germany, South Korea, North Korea, Netherlands, Norway, Pakistan, Sweden, Turkey and others)

Furthermore, voting behavior on the resolution titled "Ethical imperatives for a nuclear-weapon-free world"⁴⁶ which emphasized the inherent immorality of nuclear weapons and the need for their elimination, led by the Humanitarian Group countries, was:

137 in favor (Austria, Brazil, Egypt, Indonesia, Iran, Kazakhstan, Mexico, New Zealand, Saudi Arabia, South Africa, Syria and others); 39 against (Australia, Canada, France, Germany, Israel, South Korea, the Netherlands, Norway, Poland, Russia, Sweden, Turkey, the United Kingdom, the United States and others), 10 abstentions (China, India, Japan, North Korea, Pakistan, Switzerland and others)

Decision 5 of the Second Conference of the States Parties to the TPNW established a "consultative process on the humanitarian impact and risks of nuclear weapons under the TPNW" to be held between the Conference of the States Parties and the Signatories. A report is to be submitted to the Third Conference of the States Parties, which will also highlight and promote new scientific evidence of the humanitarian impact and risks of nuclear weapons, as well as challenge the security paradigm based on nuclear deterrence by juxtaposing it with the risks and assumptions inherent in nuclear deterrence.

136 countries voted in favor of a UN General Assembly resolution drafted by Ireland and New Zealand, which aims to establish an international scientific investigation in order to re-examine the multifaceted effects of the use of nuclear weapons⁴⁷ (Australia, Austria, Brazil, Canada, China, Egypt, Germany, India, Indonesia, Iran, Japan, Kazakhstan, South Korea, Mexico, Netherlands, New Zealand, Norway, South Africa, Switzerland, Turkey and others); 3 against (France, Russia and the United Kingdom); 29 countries abstained (Israel, North Korea, Pakistan, Poland, Sweden and others). 25 countries did not vote, including the United States.

In accordance with the resolution, an

⁴⁶ A/RES/79/36, December 2, 2024.

⁴⁷ A/RES/79/238, December 24, 2024.

independent "Scientific Panel on the Effects of Nuclear War," consisting of 21 members who participate in their individual capacity, is to be established. The resolution also decided: "[T]he Panel shall be tasked with examining the physical effects and societal consequences of a nuclear war on a local, regional and planetary scale, including, inter alia, the climatic, environmental and radiological effects, and their impacts on public health, global socioeconomic systems, agriculture and ecosystems, in the days, weeks and decades following a nuclear war, and that it shall review and commission relevant studies, including modelling where appropriate, and publish a comprehensive report, make key conclusions and identify areas requiring future research."

As in the previous year, the 2024 UNGA resolution on nuclear disarmament led by Japan "[r]eiterat[ed] deep concern at the catastrophic humanitarian consequences of the use of nuclear weapons and reaffirm[ed] that this awareness ought to continue to underpin our approaches and efforts towards nuclear disarmament, and welcome[ed] the visits of leaders, youth and others to Hiroshima and Nagasaki in this regard.⁴⁸

B) Victim assistance and environmental remediation

Assistance to victims of nuclear weaponsrelated activities, including their use, test and production, and remediation of the contaminated environment are also important from the perspective of the humanitarian consequences of nuclear weapons. Article 6 of the TPNW stipulates provision of assistance to victims affected by the use or testing of nuclear weapons, as well as the implementation of necessary and appropriate measures towards the environmental remediation of areas so contaminated. There are also some cases that some countries which have not signed or ratified the TPNW have addressed on an individual basis.

At the Second Meeting of States Parties to the TPNW (2MSP) held in 2023, Kazakhstan and Kiribati submitted the "Report of the Co-Chairs of the informal working group on victim assistance, environmental remediation, international cooperation and assistance" as cofacilitators for these issues. Decision 4, which was adopted at the 2MSP, stipulated that "focused discussions will be held under the informal working group on victim assistance, environmental remediation, international cooperation and assistance"; and "a report will be submitted to the third Meeting of States Parties with recommendations related to the feasibility of, and possible guidelines for, the establishment of an international trust fund for victim assistance and environmental remediation, with the aim of examining the establishment of such a trust fund at the third Meeting of States Parties as a priority."

At the NPT PrepCom in 2024, Kazakhstan, Kiribati and the Marshall

⁴⁸ A/RES/79/41, December 2, 2024.

Islands jointly stated:49

New scientific research has revealed the multifaceted and cascading effects of the catastrophic humanitarian impact of nuclear weapons detonations and their associated risks. These effects and risks include persistent radiological contamination at test sites—especially near indigenous and non-self-governing peoples—higher radiation exposure than had previously been suggested, and the disproportionate impact of ionizing radiation on women and girls.

These studies are important because many scientific studies conducted by the Nuclear-Weapon States are classified and restricted to the public, including victims and atomic veterans who participated in the tests in service of the Nuclear-Weapon States.

Furthermore, there was no disclosure of the harm to people and the environment caused by nuclear tests, and in some cases even deliberate studies of the impacts on the health of people exposed to large amounts of radiation. Those affected by the nuclear tests often received little or no physical protection from the radioactive fallout of these tests. Consequently, they suffered both physical and psychological harm.

The survivors of the past use of nuclear weapons (hibakusha), those who have suffered the use of nuclear weapons irrespective of their nationalities and origins, have continuously highlighted the unacceptable humanitarian and environmental consequences and ongoing legacies caused by the uncontrollable destructive capability and indiscriminate nature of nuclear weapons.

At this NPT PrepCom, we are requesting the Nuclear Weapon States, which conducted the tests, to recognize the transboundary effects of nuclear weapons, including the intergenerational physical, mental and social trauma caused by nuclear testing, acknowledge their responsibility to provide technical and financial assistance to affected States Parties, communities, and atomic veterans, and pledge to provide access to scientific information related to the humanitarian and environmental impacts of the nuclear tests.

In the long-run, we are requesting pledges by States Parties, in a position to do so, to offer financial, technical and scientific resources to help affected States Parties and expansion of national policies to provide compensation to second and third-generation victims in fulfillment of their obligations pursuant to international law and the relevant resolutions. Moreover, we call on NWS to take immediate practical measures towards complying with their respective obligations under Article VI and implementing their agreed commitments on the total elimination of nuclear weapons in a verifiable, transparent and irreversible manner within a specific timeframe in order to save the present and future generations from the catastrophic humanitarian consequences of nuclear weapons.

⁴⁹ "Joint Statement on the Legacy of Nuclear Weapons," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

Among the NNWS allied with the United States, for instance, Germany stated that "[v]ictims' assistance and environmental remediation from the long-term damages of nuclear testing likewise deserve broader attention and engagement. Germany actively supports concrete project work on victims assistance and environmental remediation."⁵⁰

The UNGA resolution titled "Addressing the legacy of nuclear weapons: providing victim assistance and environmental remediation to Member States affected by the use or testing of nuclear weapons"51submitted by Kazakhstan and Kiribati and adopted at the General Assembly since 2023-encourages international cooperation and discussion on victim assistance and environmental remediation. It also notes "the humanitarian provisions on victim assistance, environmental remediation, international cooperation and assistance of the Treaty on the Prohibition of Nuclear Weapons, which entered into force on January 21, 2021, and the references to these humanitarian provisions contained in the Vienna Action Plan, adopted at the First Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons." It references "the report of the Secretary-General entitled 'Addressing the legacy of nuclear weapons: providing victim assistance and environmental remediation to Member States affected by the use or testing of nuclear weapons', in particular

the Secretary-General's observations that efforts are under way to establish further mechanisms for the provision of international cooperation and support in relation to victim assistance and environmental assessment and remediation."52 The voting behavior of countries surveyed in this project on this resolution is as follows: 174 in favor (Australia, Austria, Brazil, Canada, Egypt, Germany, Indonesia, Iran, Japan, Kazakhstan, South Korea, Mexico, Netherlands, New Zealand, Norway, Saudi Arabia, South Africa, Sweden, Switzerland, Syria, Turkey and others); 4 against (France, Russia, the United Kingdom and North Korea); 6 abstentions (China, India, Israel, Pakistan, Poland and the United States). Additionally, following the previous year's resolution, countries such as Australia, Austria, Canada, France, Iran, Japan, Kazakhstan, Mexico, New Zealand, Switzerland, the United Kingdom, and the United States submitted reports on victim assistance and environmental remediation.

In addition to the issues mentioned above, the following developments regarding victim assistance and environmental remediation were reported in 2024:

On February 28, the President of the Marshall Islands, Hilda Cathy Heine, said that she hoped for a revision of the TPNW before her country could sign it, specifically referencing the

⁵⁰ "Statement by Germany," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 25, 2024.

⁵¹ A/RES/79/60, December 2, 2024.

⁵² Ibid.

clause according to which countries that have suffered nuclear weapons damage are responsible for supporting victims and restoring the environment.⁵³

 \geq In June 2024, the Radiation Exposure Compensation Act (RECA), which the U.S. Congress first enacted in 1990 to compensate Americans exposed to radiation from nuclear testing during World War II and uranium mining in the United States during the Cold War, was not extended and therefore expired.⁵⁴ In March 2024, the U.S. Senate passed a standalone bill to extend and expand this act, which failed to pass the House of Representatives because Republican House Speaker Mike Johnson blocked the vote in the lower chamber. According to the Department of Justice, approximately 41,000 people had received compensation by June 9, 2024, with the total amount reaching approximately 2.6 billion dollars. The expanded and enlarged version of RECA passed the Senate this spring with 69 votes in favor and 30 votes against, and had the support of President Biden. The extended version of RECA aimed to expand eligibility to include not only Nevada, Arizona, and Utah, but also residents downwind of Idaho, Montana, Colorado, New Mexico and Guam, who had previously been excluded.⁵⁵ In addition, it was also intended to include miners who had been exposed to radiation up to 1990, but the bill expired without these compensations.

 \geq On September 9, 44 people who experienced the atomic bombing of Nagasaki but were not recognized as atomic bomb survivors because they were outside the designated bombed area, filed a lawsuit against the city of Nagasaki and Nagasaki Prefecture, demanding that they be issued atomic bomb survivor health handbooks.56 Presiding Judge Shinsuke Matsunaga said there is a "relevant probability" that nuclear fallout was observed in the Eastern Nagasaki district where the 15 certified survivors were when the bomb exploded, based on surveys by the central and local governments. They also developed illnesses included in the list of 11 diseases that are subject to government support for Abomb survivors, according to the ruling, and ordered to issue health

⁵³ "Marshall Islands Wants Nuclear Weapons Ban Pact Amended," *Kyodo News*, February 28, 2024, https://english.kyodonews.net/news/2024/02/5ff2bd195f28-marshall-islands-wants-nuclear-weapons-ban-pact-amended.html.

⁵⁴ Chris Rostampour, "Congress Lets Aid Program for Downwinders Expire," *Arms Control Association*, July/August 2024, https://www.armscontrol.org/act/2024-07/news/congress-lets-aid-program-down winders-expire.

⁵⁵ Aspen Coriz-Romero and Anila Lopez Marks, "America's Nuclear 'Downwinders' Deserve Justice," Colorado Newsline, September 9, 2024, https://coloradonewsline.com/2024/09/09/americas-nuclear-downwinders-deserve-justice/.

⁵⁶ "Court Widens Benefit Eligibility for Nagasaki A-Bomb Survivors," *Kyodo News*, September 9, 2024, https://english.kyodonews.net/news/2024/09/197a0b331890-court-widens-benefit-eligibility-for-nagasa ki-a-bomb-survivors.html.

handbooks.57 In addition, on September 20, Prime Minister Fumio Kishida announced his intention to provide relief measures for A-bomb survivors, and government officials revealed that he was coordinating a direction to provide support to all Abomb survivors, not merely the 15 people recognized as such by the Nagasaki District Court. On the following day, the Ministry of Health, Labor and Welfare eased the conditions for subsidizing medical expenses and expanded the scope of relief.58 On the same day, Prime Minister Kishida expressed his intention to provide the same level of medical fee subsidies "to all A-bomb survivors, regardless of whether they are plaintiffs in the lawsuit, from as early as possible within the year." However, these measures did not lead to the recognition of the A-bomb survivors, who continue to request recognition.

On September 27, President Hilda Heine of the Marshall Islands called on the UN to apologize for its indirect involvement in the U.S. nuclear testing carried out in her country.⁵⁹ President Heine said that the nuclear testing "has left an ongoing legacy of death, disease and contamination. Its effects are continuing for generations."

(4) Treaty on the Prohibition of Nuclear Weapons (TPNW)

A) Signature and Ratifications

The number of countries that have signed and/or ratified the TPNW (adopted on September 20, 2017) has steadily increased. As the number of ratifying countries reached 50 on October 24, 2020, the TPNW entered into force on January 22, 2021, in accordance with Article 15 of the treaty. As of the end of 2024, 73 countries out of 94 signatories have ratified the treaty. Among the countries surveyed, those that have ratified are Austria, Indonesia, Kazakhstan, Mexico, New Zealand and South Africa. Brazil has only signed the treaty.

B) Meeting of States Parties

The Third Meeting of States Parties will be held from March 3 to 7, 2025, at the UN Headquarters in New York, with Kazakhstan serving as President.⁶⁰

Prior to this meeting, during the 2024 NPT PrepCom, Kazakhstan stated, on behalf of the State Parties to the TPNW,

⁵⁷ Ibid.

⁵⁸ "Kishida Vows Aid to Uncertified Nagasaki Atomic Bomb Survivors," *The Japan Times*, September 21, 2024, https://www.japantimes.co.jp/news/2024/09/21/japan/kishida-nagasaki-vow/.

⁵⁹ "Marshall Islands Demands UN Apology for Nuclear Tests," *Barron's*, September 26, 2024, https://www.barrons.com/news/marshall-islands-demands-un-apology-for-nuclear-tests-2e9051f8.

⁶⁰ The main points of discussion at the Second Conference of States Parties held in 2023 included concerns about security policies based on nuclear weapons (nuclear deterrence), the three working groups, the continuation of SAG-related work, complementarity and gender, strengthening discussions for the creation of an international trust fund for nuclear victim assistance, and the establishment of a new consultation process regarding security concerns.

that "[w]e are concerned by the continued and increasing salience of and emphasis on nuclear weapons in military postures and doctrines. This along with scientific and technological advances in other strategic capabilities, such as Artificial Intelligence, is creating worrying new risks and uncertainties. We, therefore, cannot stand idly by while signs indicate that humanity is moving closer to global nuclear catastrophe at this dangerous inflection point. [...] These humanitarian considerations should be at the center of all disarmament policies, highlighting the human cost of nuclear weapons and the need to protect human life and the environment. The TPNW's Scientific Advisory Group (SAG) plays a valuable role in this regard."61 Kazakhstan urged all states that have not yet joined the TPNW to do so without delay and without preconditions.

Furthermore, NAM countries stated that "[t]he Group welcomes the multilateral efforts towards nuclear disarmament and the total elimination of nuclear weapons. We take note of the entry into force of the Treaty on the Prohibition of Nuclear Weapons (TPNW) on January 22, 2021, as well as its first and second meetings of States Parties. It is hoped that the Treaty would contribute to furthering the objective of the total elimination of nuclear weapons. NAM States Parties to the TPNW and Signatories are fully committed to its implementation and are engaging constructively in preparation for the Third Meeting of States Parties to the TPNW in 2025 towards achieving a world free of nuclear weapons."₆₂

C) Arguments by signatory and ratification countries

Countries supporting the TPNW have advocated its importance at the 2024 NPT PrepCom, particularly regarding the humanitarian consequences of nuclear weapons, their legal prohibition and effective measures to implement NPT Article VI. They have argued that the TPNW is complementary to the NPT. The states parties and signatory states to the TPNW jointly stated: "As fully committed states parties to the NPT, the cornerstone of the nuclear disarmament and non-proliferation regime, we will continue to implement our obligations and commitments under the NPT and under complementary treaties, such as the Comprehensive Nuclear-Test-Ban Treaty (CTBT), treaties establishing nuclearweapon free-zones, and the TPNW itself."63 They also urged "all states that have not yet done so to join the Treaty on the Prohibition of Nuclear Weapons without delay and without preconditions. We appeal to all States to engage cooperatively with the Treaty and work with us in support of our shared goal of a world free of nuclear weapons. We

⁶¹ "Statement by States Parties to the Treaty on the Prohibition of Nuclear Weapons," General Statement, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

⁶² "Statement by NAM," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

⁶³ "Joint Statement on the TPNW," General Statement, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

encourage all states to attend the Third Meeting of TPNW States Parties in March 2025."

At the 2024 UNGA, a resolution titled "Treaty on the Prohibition of Nuclear Weapons"⁶⁴ was adopted, which called upon all states that have not yet done so to sign, ratify, accept, approve or accede to the treaty at the earliest possible date. The voting behavior of countries surveyed in this project on this resolution was as follows:

127 in favor (Austria, Brazil, Egypt, Indonesia, Iran, Kazakhstan, Mexico, New Zealand, South Africa and others); 44 against (Canada, China, France, Germany, India, Israel, Japan, South Korea, North Korea, the Netherlands, Norway, Pakistan, Poland, Russia, Sweden, Turkey, the United Kingdom, the United States and others); 13 abstentions (Australia, Saudi Arabia, Switzerland and others) – Syria did not vote.

Regarding the legal prohibition of nuclear weapons, the 2022 UNGA adopted two resolutions, titled "Follow-up to the advisory opinion of the International Court of Justice on the legality of the threat or use of nuclear weapons"⁶⁵ and "Convention on the prohibition of the use of nuclear weapons."⁶⁶ The voting behaviors of the countries surveyed were as follows:

"Follow-up to the advisory opinion of

the International Court of Justice on the legality of the threat or use of nuclear weapons"— 135 in favor (Austria, Brazil, China, Egypt, Indonesia, Iran, Kazakhstan, Mexico, New Zealand, Saudi Arabia, South Africa, Switzerland, Syria and others); 35 against (Australia, France, Germany, Israel, South Korea, Poland, Russia, Sweden, Turkey, the United Kingdom, the United States and others); 15 abstentions (Canada, India, Japan, North Korea, the Netherlands, Norway Pakistan and others) – Syria did not vote.

"Convention on the prohibition of the use of nuclear weapons"—121 in favor (China, Egypt, India, Indonesia, Iran, Kazakhstan, Mexico, South Africa, Syria, Saudi Arabia and others); 49 against (Australia, Austria, Canada, France, Germany, Israel, South Korea, the Netherlands, New Zealand, Norway, Poland, Sweden, Switzerland, Turkey, the United Kingdom, the United States and others); 12 abstentions (Brazil, Japan, North Korea, Pakistan, Russia, and others).

⁶⁴ A/RES/79/38, December 2, 2024.

⁶⁵ A/RES/79/32, December 2, 2024.

⁶⁶ A/RES/79/64, December 2, 2024.

D) Countries not signing the TPNW

Nuclear-weapon states reiterated their refusal to sign the TPNW. They maintained that the TPNW has not attained the status of customary international law concerning the prohibition of nuclear weapons. They also assert that the treaty does not create any legal obligations for states that have not signed the treaty.

Most NWS did not necessarily express strong criticism of the TPNW at the NPT PrepCom. However, Russia voiced stern objections: "In the current extremely adverse international security environment, we believe it to be twice as obvious that any concepts involving 'short cuts' to a nuclear-weapon-free world, including immediately outlawing nuclear weapons as a means of ensuring security, are unworkable. We continue to consider such initiatives, including the TPNW, counter-productive, as they cannot bring us any closer to reaching nuclear zero, but rather deepen the divide between the parties to the NPT, shaking the foundations of its regime."67

Among the countries surveyed that are not signatories to the TPNW, Australia, Egypt, Germany, Norway and Switzerland participated in the Second Conference of

the Parties as observers. Among them, Switzerland argued in March 2024 that it would be more expedient to commit to a nuclear-weapon-free world within the framework of the Nuclear Non-Proliferation Treaty (NPT), and that participation in the TPNW would not be Switzerland's best interest in the current international context, where security policy concerns have resurfaced with a new war in Europe.68 According to them, the TPNW is not recognized by the nuclear weapon states or other Western states, resulting in a limited impact: "A world without nuclear weapons can only be achieved with, and not against, the possessor states." Switzerland added that it will continue to demand that the countries concerned comply with their disarmament obligations.69

Prime Minister Shigeru Ishiba said that the Japanese government would seriously consider participating in the TPNW as an observer and that he would consider the discussions of the participating countries.⁷⁰ However, answering a Representative's question on December 2, Prime Minister Ishiba expressed a negative view on the participation as an observer at the Third Meeting of the Conference of the Parties to the TPNW, scheduled for March 2025.⁷¹ He also pointed out that no

^{67 &}quot;Statement by Russia," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 25, 2024.

⁶⁸ Timo Kirez, "Switzerland Continues to Oppose Signing UN Nuclear Weapons Ban Treaty," *Anadolu Agency*, March 27, 2024, https://www.aa.com.tr/en/europe/switzerland-continues-to-oppose-signing-un-nuclear-weapons-ban-treaty/3176603.

⁶⁹ Ibid.

⁷⁰ Francis Tang, Himari Semans, "Ishiba Openness to Nuke Ban Treaty Involvement Puts Pact in Spotlight," *The Japan Times*, October 15, 2024, https://www.japantimes.co.jp/news/2024/10/15/japan/politics/japan-pm-ishiba-nuclear-ban-treaty/.

⁷¹ Kenta Kamimura, "Japan PM Ishiba Stresses Importance of Nuclear Deterrence While Commenting on

nuclear weapons states are participating in the treaty and highlighted the lack of a roadmap to a nuclear-weapon-free world.

(5) Reduction of Nuclear Weapons

A) Reduction of nuclear weapons

The New Strategic Arms Reduction Treaty (New START) between Russia and the United States entered into force in February 2011 and was extended for five years in February 2021. Following Russia's full-scale invasion of Ukraine in February 2022, Moscow criticized U.S. sanctions and other factors in August 2022, claiming that they hindered its ability to conduct on-site inspections in the United States. The United States refuted Russia's claims and called for dialogue to resume on-site inspections.

However, on January 18, 2024, Russian Foreign Minister Lavrov announced that he had rejected a U.S. proposal to hold talks on nuclear arms control, separating the issue of Ukraine from the resumption of the Strategic Stability Dialogue. The end of Western support to Ukraine and the abandonment of policies allegedly going against Russia's interests were cited as preconditions.⁷² In addition, Vladimir Leontiev, an advisor to the Russian Foreign Minister, stated during a meeting organized by the Alexander Gorchakov Public Diplomacy Fund in Moscow that "[i]n light of everything that is happening now, we consider the U.S ideas fundamentally unacceptable. There is not and cannot be any basis not only for additional joint or coordinated measures in arms control and risk reduction, but also for a general discussion of strategic stability amid Washington-led hybrid aggression of the West against Russia. This includes both bilateral and multilateral formats, such as, for example, the Nuclear Five."⁷³

On January 31, 2024, the U.S. State Department reported the following in its annual report to Congress on the implementation of the New START:⁷⁴

Based on information available as of December 31, 2023, the United States cannot certify the Russian Federation to be in compliance with the terms of the New START Treaty. Both prior to and following the Russian Federation's purported suspension of the Treaty as of February 28, 2023, the Russian Federation violated several New START Treaty provisions in 2023. In particular, the Russian Federation failed to comply with its obligations to facilitate U.S. inspection activities on Russian territory and to convene sessions of the Bilateral

Nihon Hidankyo's Nobel Peace Prize," The Japan News, December 11, 2024, https://japannews.yomiuri.co.jp/politics/politics-government/20241211-227282/.

⁷² "Russian Foreign Minister Rejects US Proposal to Resume Nuclear Talks," *VOA*, January 18, 2024, https://www.voanews.com/a/russian-foreign-minister-rejects-us-proposal-to-resume-nuclear-talks/7446 504.html.

⁷³ "Russia Not Ready to Discuss Strategic Stability with United States," *KBC*, February 9, 2024, https://www.kbc.co.ke/russia-not-ready-to-discuss-strategic-stability-with-united-states/.

⁷⁴ U.S. Department of State, "Report to Congress on Implementation of the New START Treaty," January 31, 2024, https://www.state.gov/2023-report-to-congress-on-implementation-of-the-new-start-treaty/.

Consultative Commission (BCC), violations that also occurred in 2022. Additionally, in the wake of its legally invalid purported suspension of the New START Treaty starting in February 2023, the Russian Federation failed to comply with its obligations to provide Treatyrequired notifications and data updates, and its obligations related to the exchange of telemetric information.

In addition, Russia's violation of its obligations to facilitate inspection activities on Russian territory, provide biannual data updates, and send notifications pertaining to strategic offensive arms subject to the Treaty negatively affects the ability of the United States to verify Russia's compliance with the New START Treaty's deployed warhead limit. The United States assesses that the Russian Federation likely did not exceed the New START Treaty's deployed warhead limit in 2023. However, due to the uncertainty generated by Russia's failure to fulfill its obligations with respect to the Treaty's verification regime, the United States was unable to verify that the Russian Federation remained in compliance throughout 2023 with its obligation to limit its deployed warheads on delivery vehicles subject to the New START Treaty to 1,550.

At the same time, it concluded that "[a]lthough the United States cannot certify that the Russian Federation is in compliance with the terms of the New START Treaty, the United States does not determine, per Condition (a)(1) of the Senate's Resolution of Advice and Consent to Ratification of the New START Treaty, that Russia's noncompliance specified in this report threatens the national security interests of the United States."⁷⁵

In response to this, Kremlin spokesman Dmitry Peskov told the media on October 1 that Russia will not discuss signing with the United States a new treaty aiming to replace an agreement that already limits each side's strategic nuclear weapons, as this agreement needs to be broadened and expanded to cover other states. He added the following:

Earlier this year, Russian President Vladimir Putin] said that in view of the changed conditions, it is virtually impossible to discuss strategic offensive weapons, arsenals and so on, without taking into account the military nuclear infrastructure in Europe, without including European states in the negotiation process and without touching on other elements of strategic security, and that Russia will not do so. [...] We must take a sober look at the situation that has developed and, taking into account all the new aspects, organise the negotiation process. It seems to us that it would be at the very least unreasonable to insist on conducting such negotiations pretending that nothing has happened. Russia is not going to do that.76

Meanwhile, Russia stated that it would continue to give advance notice of missile tests to the United States under the 1988

⁷⁵ Ibid.

⁷⁶ "Russia Says It Won't Discuss New Nuclear Treaty with US in Current Form," *Reuters,* October 1, 2024, https://www.reuters.com/world/russia-says-it-wont-discuss-new-nuclear-treaty-with-us-current-fo rm-2024-10-01/.

		U.S.		Russia				
	Deployed strategic (nuclear) warheads	Deployed strategic (nuclear) vehicles	Deployed/non- deployed strategic delivery vehicles/launchers	Deployed strategic (nuclear) warheads	Deployed strategic (nuclear) vehicles	Deployed/non- deployed strategic delivery vehicles/launchers		
Aggregate limits	1,550	700	800	1,550	700	800		
Mar. 2012	1,737	812	1,040	1,492	494	881		
Sep. 2012	1,722	806	1,034	1,499	491	884		
Mar. 2013	1,654	792	1,028	1,480	492	900		
Sep. 2013	1,688	809	1,015	1,400	473	894		
Mar. 2014	1,585	778	952	1,512	498	906		
Sep. 2014	1,642	794	912	1,643	528	911		
Mar. 2015	1,597	785	898	1,582	515	890		
Sep. 2015	1,538	762	898	1,648	526	877		
Mar. 2016	1,481	741	878	1,735	521	856		
Sep. 2016	1,367	681	848	1,796	508	847		
Mar. 2017	1,411	673	820	1,765	523	816		
Sep. 2017	1,393	660	800	1,561	501	790		
Feb. 2018	1,350	652	800	1,444	527	779		
Sep. 2018	1,398	659	800	1,420	517	775		
Mar. 2019	1,365	656	800	1,461	524	760		
Sep. 2019	1,376	668	800	1,426	513	757		
Mar. 2020	1,372	655	800	1,326	485	754		
Sep. 2020	1,457	675	800	1,447	510	764		
Mar. 2021	1,357	651	800	1,456	517	767		
Sep. 2021	1,389	665	800	1,458	527	742		
Mar. 2022	1,515	686	800	1,474	526	761		
Sep. 2022	1,420	659	800	1,549	540	759		
Mar. 2023	1,419	662	800					

Table 1-4: Russian and U.S. strategic (nuclear) delivery vehicles and warheads under the New START

Due to the treaty's counting rules, the number of warheads cited above does not accurately reflect the actual situation of nuclear forces in both countries. The New START counts a heavy bomber as one delivery system and one nuclear warhead, despite the fact that the bombers can actually load 6-20 warheads. Also, according to its counting rule stipulated in the Treaty, for ICBMs and SLBMs, the number of warheads shall be the number of reentry vehicles emplaced on deployed ICBMs and on deployed SLBMs.

Sources: The U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms of the United States and the Russian Federation, February 2011 – September 2020," Fact Sheet, March 5, 2021, https://www.state.gov/new-start-treaty-aggregate-numbers-of-strategic-offensive-arms-of-the-united-states-and-the-russian-federation-february-2011-september-2020/; The U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," https://www.state.gov/.

Ballistic Missile Launch Notification Agreement.⁷⁷ In fact, before Intercontinental Ballistic Missile (ICBM) launch tests conducted by the United States and Russia in 2024, both countries

provided advance notice to each other.78

While the status of their strategic nuclear delivery vehicles and warheads under New START had been periodically updated on the U.S. Department of State's website, as

⁷⁷ Vladimir Isachenkov, "Russia to Keep Missile Test Notices under Cold War-Era Deal," AP, March 31, 2023, https://apnews.com/article/russia-us-nuclear-start-treaty-test-warnings-5e7efae0ab2d52ece5d5e1e 8609152b0.

⁷⁸ For instance, on March 2, 2024, a senior official of the U.S. Department of Defense revealed that Russia had notified the United States about conducting a launch test of the Yars ICBM from the Plesetsk cosmodrome. "Russia Notifies US of Yars Missile Launch, Pentagon Official Says," *TASS*, March 2, 2024, https://tass.com/world/1754573.

a result of Russia's suspension of implementation, the data as of March 2023 only includes the number of U.S. strategic forces.⁷⁹

B) A concrete plan for further reduction of nuclear weapons

In 2024, there was no new proposal by NWS and nuclear-armed states to take concrete measures for further reductions of their nuclear arsenals.

On March 18, U.S. Ambassador to the UN Linda Thomas-Greenfield said that the United States was willing to engage in bilateral nuclear disarmament talks with Russia and China without preconditions. At the NPT Preparatory Committee, the United States stated: "We have made clear our readiness to engage on future arms control frameworks with Russia and to work to reduce nuclear risks with the PRC. However, Russia's noncompliance with existing obligations and outright rejection of arms control dialogue casts a shadow over the likelihood of a New START successor after February 2026. Meanwhile, the PRC continues to show no interest in engaging bilaterally on risk reduction or arms control, as demonstrated by its suspension of our bilateral consultations".⁸⁰

In response to this, Russia's head of the

Department of Non-Proliferation and Arms Control at the Foreign Ministry explained that Russia was prepared to discuss nuclear arms control issues if they were part of a single package of security and stability issues.⁸¹ In addition, Vladimir Ermakov, Director of the Department of Disarmament and Non-Proliferation of the Russian Ministry of Foreign Affairs, stated that he had not received any "fundamentally new ideas" from the United States regarding strategic stability and arms control, and that it was "pointless to talk about the New START and its successor at this stage."⁸²

The United States continued to approach Russia with offers to hold talks on nuclear arms control, but Russia continued to insist, as mentioned above, that it would not be able to participate in talks as long as the United States pursued a "hostile policy" towards Russia.

China has consistently insisted that any participation in the nuclear weapons reduction process would be premature. At the NPT PrepCom in 2024, China stated that "[t]he two countries with the largest nuclear arsenals must continue to fulfill their special and primary responsibilities for nuclear disarmament, resume implementing the New START Treaty and discuss follow-up arrangements, and

 ⁷⁹ New START Treaty Aggregate Number of Strategic Offensive Arms," U.S. Department of State, May 12, 2023, https://www.state.gov/new-start-treaty-aggregate-numbers-of-strategic-offensive-arms-5/.
⁸⁰ "Statement by the United States," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 24, 2024.

⁸¹ Guy Faulconbridge, Dmitry Antonov, "Russia Responds Icily to U.S. Hint on Arms Control Talks with Moscow and Beijing," *Reuters*, March 20, 2024, https://www.reuters.com/world/russia-says-strategic-talks-with-us-possible-only-part-broader-debate-2024-03-20/.

⁸² Yevgeny Kuklychev, "Russia Gives 'Conditions' for Renewing US Nuclear Deal," *Newsweek*, April 12, 2024, https://www.newsweek.com/russia-gives-conditions-renewing-us-nuclear-deal-1889714.
further significantly and substantially reduce their nuclear arsenals in a verifiable, irreversible and legally binding manner, so as to create the conditions for other nuclear-weapon States to join the nuclear disarmament process."83 China also stated the following: "For the past six decades, China's understanding of the nature of nuclear weapons has remained unchanged. China's nuclear policy is highly stable, consistent and predictable, and is the most meaningful transparency. China's nuclear policy in itself is an important contribution to the cause of international nuclear disarmament and non-proliferation. Some countries deliberately misinterpret or even smear China's nuclear policy. China strongly opposes those deeds. China is open to having dialogues and consultations on arms control and non-proliferation with all countries. However, China will not accept the practice of claiming to be willing to have dialogue, while constantly taking negative actions that undermine China's core interests."84 Furthermore, on July 17, the Chinese Ministry of Foreign Affairs announced that it would temporarily suspend arms control talks with the United States. These talks had begun in November 2023, as part of an

attempt to restart bilateral dialogue in order to avoid accidental clashes.85 Chinese Foreign Ministry spokesperson Lin Jian said repeated U.S. arms sales to Taiwan in recent months had "seriously compromised the political atmosphere for continuing the arms-control consultations. Consequently, the Chinese side has decided to hold off discussion with the United States on a new round of consultations on arms control and nonproliferation. The responsibility fully lies with the United States."86 U.S. State Department spokesperson Matthew Miller responded that "[u]nfortunately, by suspending these consultations, China has chosen not to pursue efforts that would manage strategic risks and prevent costly arms races, but we the United States will remain open to developing and implementing concrete risk-reduction measures with China."87 In spite of these divergences, some military-to-military talks have taken place between the United States and China in 2024, including at the highest level, as evidenced by the meeting between U.S. Defense Secretary Lloyd Austin and China's Minister of National Defense Dong Jun in Singapore on May 31.88

⁸³ "Statement by China," General Debate, Second PrepCom for the 11th NPT RevCon, July 24, 2024.
⁸⁴ Ibid.

⁸⁵ "China Says it Has Halted Arms Control Talks with U.S. Over Taiwan," *Renters*, July 18, 2024, https://www.reuters.com/world/china/china-says-it-has-halted-arms-control-talks-with-us-over-taiwan-2024-07-17/.

⁸⁶ Ibid.

⁸⁷ Ibid.

⁸⁸ Natasha Bertrand, Eric Cheung and Simone McCarthy, "US and Chinese Defense Chiefs Hold First In-Person Talks Since 2022," *CNN World*, May 31, 2024, https://edition.cnn.com/2024/05/31/ china/shangrila-dialogue-us-china-defense-chiefs-meeting-intl-hnk/index.html.

C) Trends on strengthening/ modernizing nuclear weapons capabilities

While nuclear-weapon states have reiterated their commitments to promoting nuclear disarmament, they continue to modernize and/or strengthen their nuclear weapons capabilities. At the NPT PrepCom, many NNWS expressed strong concerns about the trend toward the modernization of nuclear forces. For instance, the NAM countries stated that "[t]he Group reiterates its deep concern over the greatest threat to peace and security posed by the continued existence of nuclear weapons and related military doctrines, modernization of nuclear forces, and development of more effective and newer, including low-yield nuclear warheads as well as other policies and practices that run contrary to the principles and objectives of the Treaty (NPT) such as the continued and evolving nuclear weapons sharing arrangements and extended deterrence. The Group strongly calls for an immediate end to this trend that in fact is a new nuclear-arms race and thus a clear violation of Article VI of the Treaty."89

According to a report published by the International Campaign to Abolish Nuclear Weapons (ICAN) in June 2024, total estimated nuclear weapons-related expenditures (including modernization of nuclear forces) by nuclear-weapon states in 2023 amounted to \$91.4 billion, up from \$82.9 billion the previous year. Of this total, the United States spent \$51.5 billion, China approximately \$11.9 billion, Russia \$8.3 billion, the United Kingdom \$8.1 billion, and France \$6.1 billion.⁹⁰

<u>China</u>

China has repeatedly stated that it "has always pursued a defensive nuclear strategy and kept its military development at the minimum level required for national security. China has no intention of pursuing arms race with any country."91 However, China has not disclosed any information about the development and the deployment of its nuclear forces. The actual situation therefore remains unclear. Chinese state media reported on October 19 that President Xi Jinping had inspected a brigade of the People's Liberation Army's Rocket Force and urged the troops to boost their "deterrence and combat capabilities."92

China's Ministry of National Defense announced that it conducted an ICBM test launch with a simulated warhead on September 25, 2024, which "fell into the expected sea area" in the Pacific Ocean (see also Section 6F on nuclear risk

⁸⁹ "Statement by NAM," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

⁹⁰ ICAN, "Surge: 2023 Global Nuclear Weapons Spending, June 2024," https://www.icanw.org/surge_2023_global_nuclear_weapons_spending.

⁹¹ "Statement by China," General Debate, Second PrepCom for the 11th NPT RevCon, July 23.

⁹² Antoni Slodkowski "China's Xi Urges Missile Troops to Boost Deterrence, Combat Capabilities," *Reuters*, October 19, 2024, https://www.reuters.com/world/asia-pacific/chinas-xi-urges-missile-troops-boost-deterrence-combat-capabilities-2024-10-19/.

reduction in this chapter).⁹³ It is believed to be the first time in 40 years that China has conducted an ICBM launch test beyond its borders. China has not mentioned the type of ICBM it fired, but it has been pointed out that it may have been a DF-31AG.⁹⁴

There have been growing concerns in recent years over the acceleration of China's nuclear forces modernization. According to the U.S. Department of Defense's "China Military Power Report" released in December 2024, the "[Department of Defense (DoD)] estimates that the PRC will have over 1,000 operational nuclear warheads by 2030, much of which will be deployed at higher readiness levels, and will continue growing its force to 2035 in line with its goal of ensuring PLA modernization is 'basically complete' that year, an important milestone on the road to Xi's goal of a 'world class' military by 2049."95

China has kept developing ICBMs, which are central to its strategic nuclear forces, since the late 2000s, including the mobile DF-31A/AG, the fixed DF-5B capable of carrying three to five nuclear warheads with multiple independently targetable reentry vehicles (MIRV), and the mobile DF-41, which can carry approximately three nuclear warheads with MIRV capability. In its 2024 report, the DoD stated that "China will probably complete construction of three new solid-fuel silo fields, each consisting of at least 300 new ICBM silos, fields, and loaded at least some ICBMs into these silos,"96 and it estimated that China possessed 350 ICBMs and 500 launch bases.⁹⁷ In addition, General Anthony J. Cotton, Commander of the U.S. Strategic Command, stated at a Senate Armed Services Committee hearing on February 29, 2024, that "China is developing a new generation of mobile ICBMs. These developments, combined with the PRC's increasing counter-space and cyber capabilities, pose a complex, but not insurmountable challenge to U.S. strategic deterrence."98

China is also strengthening its SLBM capabilities. According to the U.S. Department of Defense, China conducts continuous maritime patrols with six Jin class (Type 094) ballistic missile-equipped

⁹³ Laurie Chen and Ben Blanchard, "China's PLA Conducts Rare Publicized Test Launch of Intercontinental Ballistic Missile," *Reuters*, September 26, 2024, https://www.reuters.com/world/china/chinas-pla-launches-intercontinental-ballistic-missile-into-pacifi c-ocean-2024-09-25/.

⁹⁴ "China Releases Images of Test-Fired ICBM Likely to Be Dongfeng-31," *Kyodo News*, September 26, 2024, https://english.kyodonews.net/news/2024/09/5b9fd3ea3d0d-china-releases-images-of-test-fired-icbm-likely-to-be-dongfeng-31.html.

⁹⁵ The U.S. Department of Defense (DOD), *Military and Security Developments Involving the People's Republic of China 2024*, December 2024, p. 101, https://media.defense.gov/2024/Dec/18/2003615520/ -1/-1/0/MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUB LIC -OF-CHINA-2024.PDF.

⁹⁶ Ibid., p. 63.

⁹⁷ Ibid., p.166.

⁹⁸ Anthony J. Cotton, "Statement," before the U.S. Senate Committee on Armed Services, February 29, 2024.

nuclear submarines (SSBNs) equipped with JL-2 or JL-3 SLBMs. It is also anticipated that construction of the nextgeneration Type 096 SSBN will begin soon.⁹⁹

The JL-3 is China's latest SLBM, with an estimated range exceeding 10,000 km, allowing it to potentially strike the U.S. mainland from the Chinese coastline.

In addition, China is in the process of completing its strategic triad with the H-6N strategic bomber, which can carry airlaunched ballistic missiles (ALBM) that can be fitted with nuclear warheads, and the H-6K strategic bomber, which can carry nuclear cruise missiles.

With regard to non-strategic nuclear forces, it is estimated that China maintains a high level of both qualitative and quantitative ground-launched short- and medium-range missile capabilities that can be used for both nuclear and conventional weapons. The DoD's 2024 "Annual Report on the Military Power of China" states that China possesses 250 launchers for intermediate-range ballistic missiles (IRBMs) and 500 such missiles; 300 launchers for medium-range ballistic missiles (MRBMs) and over 1,300 of these missiles; 300 launchers for short-range ballistic missiles (SRBMs) and 900 of these missiles.¹⁰⁰

In addition to ballistic and cruise missiles, China is also actively promoting the development of hypersonic missiles. In addition to the DF-17 hypersonic missile, which was first deployed in 2020, it was reported in 2023 that China secretly began operating the DF-27 hypersonic missile (with a range of 5 ,000 to 8,000 km) and conducted flight tests.¹⁰¹ In October 2021, it was also reported that China may have tested a fractional orbital bombardment system (FOBS).¹⁰²

France

In 2015, France announced that it possessed not more than 300 nuclear weapons. Its nuclear deterrent is made of 54 middle-range ALCMs and three sets of 16 SLBMs.¹⁰³ As of January 2025, there had been no changes to this nuclear force posture.

In March 2024, France began construction of its next-generation SSBN, the SNLE 3G: "France's future class of nuclear-powered ballistic missile submarines (SSBN), known as SNLE-3G, took a significant step forward today,

⁹⁹ The U.S. DOD, *Military and Security Developments Involving the People's Republic of China 2024*, p. 53. ¹⁰⁰ Ibid., p. 166.

¹⁰¹ Zuzanna Gwadera, "Intelligence Leak Reveals China's Successful Test of a New Hypersonic Missile," *IISS*, May 18, 2023, https://www.iiss.org/online-analysis/online-analysis/2023/05/intelligence-leak-reveals-chinas-successful-test-of-a-new-hypersonic-missile/.

¹⁰² "A Fractional Orbital Bombardment System with a Hypersonic Glide Vehicle?" *Arms Control Work*, October 18, 2021, https://www.armscontrolwonk.com/archive/1213655/a-fractional-orbital-bombard ment-system-with-a-hyper sonic-glide-vehicle/.

¹⁰³ François Hollande, "Nuclear Deterrence—Visit to the Strategic Air Forces," February 19, 2015, http://basedoc.diplomatie.gouv.fr/vues/Kiosque/FranceDiplomatie/kiosque.php?fichier=baen2015-02-23. html#Chapitre1.

when Naval Group cut steel on the first of four boats, at the submarine shipyard in Cherbourg, Normandy."104 Four SNLE 3G submarines are scheduled to be built and delivered to the navy after 2035. Naval Group expects to start assembling the various sections of the first submarine around 2026-2027 ahead of a launch in the early 2030s and a delivery to the French Navy "after" 2035. The exact year remains confidential at this stage.¹⁰⁵ France plans to complete the development of the M51.3 SLBM, which features a longer range and improved accuracy, by 2025. Additionally, in 2021, France launched a program¹⁰⁶ to develop the M51.4 SLBM, designed to be deployed on the SNLE 3G submarines, with a target completion date in the early 2040s. The design and the development of the successor to the ASMP-A, the fourth-generation missile ASN4G, are already underway, with plans for its introduction in 2035. France is also developing a hypersonic glide vehicle intended for both nuclear and conventional use.

The French Ministry of Armed Forces and the French Electric Power Company (EDF) have concluded an agreement under which the two EDF reactors at the Civaux power plant will be reused to produce tritium, one of nuclear weapons' key components. "It is a testament to France's foresight in leveraging its civilian nuclear infrastructure for national defense."¹⁰⁷

<u>Russia</u>

Russia has been actively promoting the development and deployment of various types of delivery vehicles, starting with the replacement of its nuclear forces built during the Cold War, with a primary focus on maintaining its nuclear deterrence against the United States. In a speech delivered on June 21, 2024, President Putin said that Russia "plans to further develop the nuclear triad as a guarantee of strategic deterrence and to preserve the balance of power in the world."¹⁰⁸

In September 2023, it was reported that the RS-28 (Sarmat) ICBM, which is said to form the core of Russia's strategic nuclear forces, had been deployed for actual

¹⁰⁴ Xavier Vavasseur, "France Cuts Steel on its First Next Gen SSBN – SNLE-3G," *Navalnews*, March 20, 2024, https://www.navalnews.com/naval-news/2024/03/france-cuts-steel-on-its-first-next-gen-ssbn-snle-3g/.

¹⁰⁵ Ibid.

¹⁰⁶ "France Launches Program to Build New Generation of Nuclear Submarines," *Marine Link*, February 19, 2021, https://www.marinelink.com/news/france-launches-program-build-new-485431; Timothy Wright and Hugo Decis, "Counting the Cost of Deterrence: France's Nuclear Recapitalization," *Military Balance Blog*, May 14, 2021, https:// www.iiss.org/blogs/military-balance/2021/05/france-nuclear-recapitalisation.

¹⁰⁷ "Nuclear Deterrence: France Wants to Produce Tritium with EDF," *The Brussels Times*, March 19, 2024, https://www.brusselstimes.com/world-all-news/971882/nuclear-deterrence-france-wants-to-prod uce-tritium-with-edf.

¹⁰⁸ "Putin Says Russia Will Develop Its Nuclear Arsenal to Preserve Global Balance of Power," *Reuters*, June 21, 2024, https://www.reuters.com/world/europe/putin-says-russia-will-develop-its-nuclear-arsenal-preserve-global-balance-power-2024-06-21/.

combat duty.¹⁰⁹ However, experts who analyzed satellite images reported that, although Russia conducted a launch test of the RS-28 in September 2024, it ended in catastrophic failure immediately after launch.¹¹⁰ It has been pointed out that this failure may further delay the testing and eventual deployment of the RS-28.¹¹¹

In 2013, Russia began converting its submarine fleet to the Borei-class SSBN. So far, three Borei-class and four Borei Aclass submarines have been commissioned. In 2024, the fifth Borei Aclass submarine was launched.¹¹²

In May 2024, Russia announced that it had begun manufacturing groundlaunched intermediate-range missiles, which had been previously banned under the Intermediate-Range Nuclear Forces (INF) Treaty, which expired in 2019.¹¹³ It was presented as a countermeasure against the military support provided to Ukraine by the United States and other countries. In June, President Putin claimed that "the

United States has restarted the production of missiles and brought them to Denmark and the Philippines" and that "we need to respond". He also stated that "we need to decide where to deploy them depending on the situation."¹¹⁴ Then, on November 21, Russia used the Oreshnik IRBM against Ukraine. President Putin called it a live-fire test and said that Russia would continue to conduct tests and pursue mass production of this missile in the future.¹¹⁵ In December, President Putin said that "[w]hat we need now is not to improve our nuclear strategy, but to improve our 'Oreshniks. If these modern weapons systems are sufficiently developed, they will virtually eliminate the need to use nuclear weapons."116

Russia's development of "exotic" nuclear delivery systems based on new concepts has also been attracting attention. This includes the development of the Avangard hypersonic glide vehicle and the Status-6 (Poseidon) long-range nuclear

¹⁰⁹ "Russia Deploys Sarmat ICBM for Combat Duty," *The Moscow Times*, September 1, 2023, https://www.themoscowtimes.com/2023/09/01/russia-deploys-sarmat-icbm-for-combat-duty-a82333.

¹¹⁰ Mark Trevelyan, "Images Show Russia's New Sarmat Missile Suffered Major Test Failure, Researchers Say," *Reuters*, September 23, 2024, https://www.reuters.com/business/aerospace-defense/russian-missile-failed-during-test-researchers-imagery-indicate-2024-09-23/.

¹¹¹ Timothy Wright, "Russia's Sarmat ICBM Woes," *IISS*, September 26, 2024, https://www. iiss.org/online-analysis/missile-dialogue-initiative/2024/09/russias-sarmat-icbm-woes/.

¹¹² "The Fifth Ballistic Missile Submarine of The Borei-A Class of the Russian Navy Completes New Navigation Tests," *Zona Militar*, November 2, 2024, https://www.zona-militar.com/en/2024/11/02/ the-fifth-ballistic-missile-submarine-of-the-borei-a-class-of-the-russian-navy-completes-new-navigation-tests/.

¹¹³ Guy Faulconbridge and Dmitry Antonov, "Putin Says Russia May Resume Global Deployment of Intermediate Range Missiles," *Reuters*, June 29, 2024, https://www.reuters.com/world/europe/putin-says-russia-resume-production-intermediate-range-missiles-2024-06-28/.

¹¹⁴ Ibid.

¹¹⁵ Katharina Krebs, Darya Tarasova and Christian Edwards, "Russia Will Keep Testing New Ballistic Missile, Putin Says," *CNN*, November 23, 2024, https://edition.cnn.com/2024/11/23/europe/russia-testing-oreshnik-missile-putin-intl/index.html.

¹¹⁶ Brendan Cole, "Russia's Deadly New Missile Makes Nuclear Weapons Redundant, Putin Says," *Newsweek*, December 12, 2024, https://www.newsweek.com/russia-putin-nuclear-oreshnik-1998950.

torpedo, which uses nuclear propulsion and has a range of over 10,000 km. In September 2024, it was reported that two American researchers had used satellite images to identify the location of what is thought to be the deployment site of the Brevestnik nuclear-powered cruise missile, also known as the SCC-X-9 Skyfall.¹¹⁷

In February, it was reported that the U.S. government had obtained information indicating that Russia was developing nuclear weapons designed to target satellites in space.¹¹⁸ U.S. National Security Council (NSC) Coordinator for Strategic Communications, John Kirby, said that the weapons were still under development and had not yet been deployed. He added that while the situation "is a concern, it is not an imminent threat".119 Russia denied and Deputy Foreign Minister Sergei Ryabkov accused the United States of "maliciously making things up."120 President Putin also said that Russia's "position is quite clear and transparent: we have always been and remain categorically opposed to the

deployment of nuclear weapons in space. Just the opposite, we are urging everyone to adhere to all the agreements that exist in this sphere."¹²¹

The United Kingdom

As mentioned above, the United Kingdom declared in its 2021 "Integrated Review of Security, Defence, Development and Foreign Policy" that it would raise its overall nuclear warheads stockpile ceiling from a maximum of 180 to no more than 260 warheads.¹²² In addition, the United Kingdom stated in its national report submitted to the NPT RevCon that "[t]his is a ceiling, not a target, and it is not our current stockpile number. This is fully consistent with the longstanding minimum credible deterrence posture of the United Kingdom and we will continue to keep this under review in light of the international security environment."123 In October 2017, the United Kingdom began constructing a new fleet of four Dreadnought-class SSBNs to replace the

¹¹⁷ Jonathan Landay, "Exclusive: U.S. Researchers Find Probable Launch Site of Russia's New Nuclear-Powered Missile," *Reuters*, September 3, 2024, https://www.reuters.com/world/europe/us-researchers-find-probable-launch-site-russias-new-nuclear-powered-missile-2024-09-02/.

¹¹⁸ Julian E. Barnes, Karoun Demirjian, Eric Schmitt and David E. Sanger, "Russia's Advances on Space-Based Nuclear Weapon Draw U.S. Concerns," *New York Times*, February 14, 2024, https://www.nytimes.com/2024/02/14/us/politics/intelligence-russia-nuclear.html.

¹¹⁹ Aamer Madhani, Zeke Miller, "Russia Has Obtained a Troubling' Emerging Anti-Satellite Weapon, the White House Says," *Associated Press*, February 16, 2024, https://apnews.com/article/russia-anti-satellite-weapon-threat-technology-2880f9c55122dcafe87188bc92dd6cde.

¹²⁰ Guy Faulconbridge, "Is Russia Developing Space-Based Nuclear Weapon? What We Know of US Claim," *Reuters*, February 16, 2024, https://www.reuters.com/world/what-is-space-based-nuclear-weapon-us-says-russia-is-developing-2024-02-15/.

¹²¹ "Putin Says Russia Has No Intention of Putting Nuclear Weapons in Space, Denying US Claims," *Associated Press*, February 21, 2024, https://apnews.com/article/russia-putin-space-satellite-weapon-nuclear-15c91f8387ae3e6ec024e996755e321f.

¹²² United Kingdom, *Global Britain in a Competitive Age*, March 2021, p. 76, https://assets. publishing.service.gov.uk/media/60644e4bd3bf7f0c91eababd/Global_Britain_in_a_Competitive_Age__the_Integrated_Review_of_Security_Defence_Development_and_Foreign_Policy.pdf.

¹²³ NPT/CONF.2020/33, November 5, 2021.

existing Vanguard-class SSBNs. The "Defence Nuclear Enterprise Command Paper", published in March 2024, states that 31 billion pounds (including a 10billion-pound contingency) would be invested in the new SSBNs, with the first of these vessels scheduled to enter service in the early 2030s.¹²⁴ This document also revealed that future nuclear warheads to replace the submarine-launched Trident system will be developed as a "sovereign" capability, "in parallel" with the U.S. W93/Mk7 nuclear warhead. The new nuclear warhead program has been named "A21/Mk7" or "Astrea", and it will be developed without conducting a nuclear explosion test.125

The United States

The United States maintains the following modernization plans of its strategic nuclear forces:

- Constructing 12 Columbia-class SSBNs, with the first set to begin operations in 2031;
- Building 400 Sentinel Ground Based Strategic Deterrent (GBSD), the new ICBMs, to replace the 450 Minuteman III missiles;
- Developing and deploying B-21 nextgeneration strategic bombers as well as

the Long-Range Stand-Off Weapon (LRSO).

The United States reported that the development of the LRSO was progressing well toward a production decision in 2027.¹²⁶ However, regarding the Sentinel, a U.S. Air Force spokesperson stated in March 2024 that "the first flight test of the Sentinel has been postponed due to an increase in the lead time for guidance computer components" and also acknowledged that it would be delayed by more than two years compared to the initial deployment target of May 2029.127 It was also revealed that achieving the initial operational capacity would cost 37% more than originally estimated.¹²⁸ Furthermore, it was also revealed that the Sentinel program which includes not only the construction of missiles but also the modernization of 450 silos, launch control centers, three nuclear missile bases, and several other test facilities across five states – is estimated to exceed the initial budget by 81%. Despite this, the Pentagon is proceeding with the program, arguing that the threats from China and Russia leave

¹²⁴ United Kingdom Defence Nuclear Enterprise, "Delivering the UK's Nuclear Deterrent as a National Endeavour," March 2024, p. 8, https://assets.publishing.service.gov.uk/media/671b8641 956d9b52e8c6d276/Defence_Nuclear_Enterprise_Command_Paper.pdf.

¹²⁵ Ibid, p. 32.

¹²⁶ John A. Tirpak, "LRSO Stealth Nuclear Missile on Track for Production Decision in 2027," *Air & Space Forces Magazine*, April 25, 2023, https://www.airandspaceforces.com/lrso-production-decision-2027/.

¹²⁷ Michael Marrow, "Sentinel ICBM's First Flight Test Slips to 2026: Air Force," *Breaking Defense*, March 28, 2024, https://breakingdefense.com/2024/03/sentinel-icbms-first-flight-test-slips-to-2026-air-for ce/.

¹²⁸ Tara Copp, "New Sentinel Nuclear Weapons Program Is 81% Over Budget. but Pentagon Says It Must Go Forward," *AP News*, July 10, 2024, https://apnews.com/article/nuclear-sentinel-weapon-icbm-cost-39c69242301b2a273111d161573f5c56.

the United States with no choice.¹²⁹ In October, the U.S. National Nuclear Security Administration (NNSA) announced that the first production unit (FPU) for the W87-1 modification program, which is scheduled to be paired with the Sentinel ICBM, had been completed.¹³⁰ This is the first time that the United States has produced pits since productio was halted in 1989.

In its September 2024 report, the U.S. Government Accountability Office (GAO) pointed out that, in addition to significant cost overruns, the delivery of the first Columbia-class SSBN would be delayed by 12 to 16 months, pushing the timeline to between October 2028 and February 2029. This delay could jeopardize the planned start of operations in 2030.¹³¹

The decision by the Biden administration to halt the development of a nuclear sealaunched cruise missile (SLCM-N) was not included in the budget request for the year 2025, like the previous year. Indeed, in December 2023, the U.S. Congress had authorized a \$260 million budget for the development of the SLCM-N for 2024, and President Biden signed the National Defense Authorization Act (NDAA). In addition, the United States has requested a \$16 million budget for the development and manufacture of the B61-13, which will replace the B61-7 gravity nuclear bomb in 2025.¹³² The United States is also developing and manufacturing the W93 nuclear warhead for SLBMs. Department of Energy officials have stated that they plan to do so without conducting nuclear tests.¹³³

In November, a test launch of the Minuteman III ICBM was carried out, with three re-entry vehicles, one of which was a high-fidelity joint test vehicle carrying a non-nuclear explosive device, and the other two were joint test vehicles designed for telemetry.¹³⁴

<u>India</u>

India appears to be seeking the possession of a strategic nuclear triad. In March 2024, India successfully conducted the first flight test of the Agni 5 MIRVed

¹²⁹ Ibid.

¹³⁰ U.S. National Nuclear Security Administration, "NNSA Completes and Diamond-Stamps First Plutonium Pit for W87-1 Warhead," October 2, 2024, https://www.energy.gov/nnsa/articles/nnsa-completes-and-diamond-stamps-first-plutonium-pit-w87-1-warhead.

¹³¹ United States Government Accountability Office, "Columbia Class Submarine: Overcoming Persistent Challenges Requires Yet Undemonstrated Performance and Better-Informed Supplier Investments," Report to Congressional Committees, September 2024.

¹³² Aaron Mehta, "America's Newest Nuclear Warhead Will Cost Under \$100M to Produce, Budget Docs Show," *Breaking Defense*, March 12, 2024, https://breakingdefense.com/2024/03/americas-newest-nuclear-bomb-will-cost-under-100m-to-produce-budget-docs-show/.

¹³³ Bill Gertz, "Pentagon Speeding Up Work on First New Nuclear Warhead in 40 Years," *The Washington Times*, April 18, 2024, https://www.washingtontimes.com/news/2024/apr/18/pentagon-speeding-work-first-new-nuclear-warhead-4/.

¹³⁴ Chris Gordon, "Behind the Scenes of a Minuteman ICBM Launch with Three Test Warheads," *Air & Space Forces Magazine*, November 6, 2024, https://www.airandspaceforces.com/us-launches-minutemaniii-icbm-three-test-warheads/.

ICBM.¹³⁵ In August, a second Arihantclass SSBN, INS Arighaat, was commissioned.¹³⁶ India plans to commission its third SSBN in 2025.¹³⁷ Additionally, in October 2024, India launched its fourth SSBN.¹³⁸ India is developing two types of SLBMs: the K-15, with a range of 700 km, and the K-4, with a range of 3,500 km. K-4 launch tests were conducted in November 2024.¹³⁹

In 2024, India also conducted launch tests of the Agni Prime MRBM,¹⁴⁰ a new MRBM¹⁴¹ distinct from the Agni family, and the Agni 4 IRBM.¹⁴²

<u>Israel</u>

Israel has neither confirmed nor denied possessing nuclear weapons and its nuclear activities remain opaque.¹⁴³ In terms of nuclear delivery systems, Israel has developed and deployed both nuclearcapable IRBMs and SLCMs. It is also believed that Israel is upgrading the twostage Jericho II IRBM to a three-stage Jericho III, with a range of over 4,000 km.

The INS Dracon, Israel's sixth Dolphin II submarine, was launched in June 2023. It is larger than its sister ships. This increased size is believed to provide space for new missiles, as well as a vertical launch system (VLS), which can be used to deploy a wider variety of weapons.¹⁴⁴ In

¹³⁹ "India Tests 3,500 Km K-4 Nuclear-Capable Missile from INS Arighaat, Strengthening Naval Deterrence," *Northeast Herald*, November 28, 2024, https://neherald.com/national/india-tests-3500-km-k-4-nuclear-capable-missile-from-ins-arighaat-strengthening-naval-deterrence.

¹⁴⁰ "New Generation Ballistic Missile Agni-Prime Successfully Flight-Tested," *The Hindu*, April 5, 2024, https://www.thehindu.com/news/national/new-generation-ballistic-missile-agni-prime-successfully-fligh t-tested/article68027482.ece.

¹⁴¹ "India Successfully Test Fires New Version of Medium-Range Ballistic Missile," *Business Standard*, April 23, 2024, https://www.business-standard.com/external-affairs-defence-security/news/india-succ essfully-test-fires-new-version-of-medium-range-ballistic-missile-124042301107_1.html.

¹³⁵ Brad Lendon and Rhea Mogul, "India Joins Select Group of Nations Able to Fire Multiple Warheads on a Single ICBM," *CNN*, March 12, 2024, https://edition.cnn.com/2024/03/12/india/india-mirv-icbm-intl-hnk-ml/index.html.

¹³⁶ TOI News Desk, "India Commissions INS Arighat: Know All About Navy's 2nd Nuclear-Powered Submarine," *The Times of India*, August 29, 2024, https://timesofindia.indiatimes.com/india/indiacommissions-ins-arighat-know-all-about-navys-2nd-nuclear-powered-submarine/articleshow/112900556. cms.

¹³⁷ Rajat Pandit, "Amid China Standoff, India Set to Boost Naval Power With 3rd N-Sub in 6 Months," *The Times of India*, August 30, 2024, https://timesofindia.indiatimes.com/city/delhi/india-to-commission-3rd-n-sub-amid-china-standoff/articleshow/112907048.cms.

¹³⁸ Dinakar Peri, "India's Fourth Nuclear Submarine Launched into Water," *The Hindu*, October 23, 2024, https://www.thehindu.com/news/national/indias-fourth-nuclear-submarine-launched-into-water/article68783731.ece.

¹⁴² "Agni-4 IRBM Missiles Tested Off Odisha Coast," *The Times of India*, September 7, 2024, https://timesofindia.indiatimes.com/india/agni-4-irbm-missile-tested-off-odisha-coast/articleshow/1131 37351.cms.

¹⁴³ See, for instance, Hans M. Kristensen and Matt Korda, "Nuclear Notebook: Israeli Nuclear Weapons, 2022," *Bulletin of the Atomic Scientists*, January 17, 2022, https://thebulletin.org/premium/2022-01/nuclear-notebook-israeli-nuclear-weapons-2022/.

¹⁴⁴ Maya Carlin, "Dolphin-Class: Israel's Submarines Might Have a Big Nuclear Secret," *The National Interest*, February 21, 2024, https://nationalinterest.org/blog/buzz/dolphin-class-israels-submarines-might-have-

addition, Israel signed an agreement with Germany in 2022 to procure new Dakarclass submarines to replace its three Dolphin-class submarines.

<u>Pakistan</u>

Pakistan has prioritized the development and deployment of nuclear-capable short-, medium- and intermediate-range missiles to ensure deterrence against India. In 2024, launch tests were carried out for the Shaheen II and other missiles. An image taken in 2023 and released in July 2024 showed a Pakistani JF-17 equipped with the nuclear-capable Raad I ALCM.145 In October 2023, Pakistan conducted test launches of the Ababeel MIRVed IRBM and the single-warhead Hatf-5 IRBM. However, Pakistan is still not believed to possess MIRV technology. It is also developing the Hatf-7 ground launched cruise missile (GLCM), designed to be nuclear-capable.

North Korea

North Korea continued its active nuclear and missile development in 2024.¹⁴⁶ In October 2024, General Secretary Kim Jong Un inspected a strategic missile. According to the Korean Central News Agency (KCNA), "[n]oting that the strategic missile force is the core force playing a pivotal role in the DPRK's war deterrence, he stressed that it is an important principle of the strategy for building the national defence consistently maintained by the [Workers' Party of Korea (WPK)] to technically modernize overall armed forces by giving priority to the strategic missile force in the future, too."¹⁴⁷ Then, on October 31, North Korea conducted an ICBM launch test. North Korea reported that the missile was a Hwasong-19, which reached a maximum altitude of 7,687.5 km and a distance of 1,001.2 km in 1 hour, 25 minutes, and 56 seconds (the longest flight altitude and time ever recorded).148

On July 1, North Korea reported that it successfully tested the launch of the new "Mars 11 Da-4.5" tactical ballistic missile, capable of carrying a 4.5-ton class superlarge warhead, and verified its flight stability and accuracy at a maximum range of 500km and a minimum range of 90km.¹⁴⁹ South Korea expressed the view

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¹⁴⁵ "Is China Fueling Pakistan's Nuclear Ambitions Against India?" *The Economic Times*, July 4, 2024, https://economictimes.indiatimes.com/news/defence/is-china-fueling-pakistans-nuclear-ambitions-agai nst-india/articleshow/111477424.cms.

¹⁴⁶ See also "North Korean Missile Launches & Nuclear Tests: 1984-Present," CSIS Missile Threat Project, https://missilethreat.csis.org/north-korea-missile-launches-1984-present/.

¹⁴⁷ "Respected Comrade Kim Jong Un Inspects Strategic Missile Bases," *KCNA Watch*, October 24, 2024, https://kcnawatch.org/newstream/1729674078-414756392/respected-comrade-kim-jong-un-inspects-strategic-missile-bases/.

¹⁴⁸ "Test-fire of DPRK's Latest ICBM Hwasongpho-19 Successfully Conducted under Guidance of Respected Comrade Kim Jong Un," *KCNA*, November 1, 2024, http://www.kcna.co.jp/item/2024/202411/news01/20241101-01ee.html.

¹⁴⁹ "DPRK Missile Administration Conducts Test-fire of New-type Tactical Ballistic Missile," *KCNA*, July 2, 2024, http://www.kcna.kp/en/article/q/14ae7c8ab80f4e66d72d9efa4c5fa16d1cfd6beecb3161b6

that "the possibility of deception should be given weight."¹⁵⁰

In addition, North Korea reportedly carried out a successful test launch of a solid-fueled medium- to long-range ballistic missile equipped with a hypersonic warhead on January 14.¹⁵¹ It also conducted test launches of the Hwasong-12 strategic cruise missile on January 24 and April 19.

In mid-January, it was reported that North Korea had carried out a key test of the underwater nuclear weapons system "Haeil-5-23", currently developed by the Underwater Weapons System Research Institute of the Academy of National Defense Sciences. The test took place in the East Sea (Sea of Japan).¹⁵² South Korea expressed doubt as to whether the test had actually taken place.¹⁵³

In August 2024, North Korea registered with the International Maritime Organization (IMO) the "Kim Kimun Ok Hero", a tactical nuclear attack submarine capable of carrying SLBMs which was launched in September 2023. It is estimated that this submarine is equipped with 10 vertical missile launch tubes. Four large hatches apparently were designed for the Puksuksong SLBMs while six smaller missile hatches might be used for the modified KN-23 SLBM.¹⁵⁴ In the meantime, North Korea had announced plans to launch three additional military reconnaissance satellites by the end of 2024. North Korea launched a rocket on May 28, which ended in failure a few minutes later.

(6) Diminishing the Roles and Significance of Nuclear Weapons in National Security Strategies and Policies

A) The current status of the roles and significance of nuclear weapons

In the latter half of the 2010s, as great power and geopolitical competitions have become more intense, NWS and nucleararmed states have reaffirmed the roles and significance of their nuclear weapons within their national security strategies. There is an observable trend of these states increasingly relying on nuclear deterrence in response to ongoing and

⁹e582ab5b8ecfeda98285842770af9d9796f9b9dbc19efcc.kcmsf.

¹⁵⁰ Jack Kim, "North Korea Says It Tested Ballistic Missile Capable of Carrying Super-Large Warhead," *Reuters,* July 2, 2024, https://www.reuters.com/world/asia-pacific/north-korea-says-it-tested-ballistic-missile-capable-carrying-super-large-2024-07-01/.

¹⁵¹ "Hypersonic Missile Test-fire Conducted in DPRK," *KCNA*, January 15, 2024, http://www.kcna.kp/en/article/q/14ae7c8ab80f4e66d72d9efa4c5fa16d1cfd6beecb3161b69e582ab5b8ec feda11f30ef6f2b9f2c4591b19d033de8fb1.kcmsf.

¹⁵² "Spokesman for Ministry of National Defence of DPRK Issues Press Statement," KCNA, January 19, 2024, http://www.kcna.kp/en/article/q/14ae7c8ab80f4e66d72d9efa4c5fa16d1cfd6beecb3161b69 e582ab5b8ecfeda096e0f3a6a40b69e3b42af2b241dd2de.kcmsf.

¹⁵³ Frances Mao, "North Korea Conducts 'Underwater Nuclear Weapons System' Test - State Media," *BBC*, January 19, 2024, https://www.bbc.com/news/world-asia-68027356.

¹⁵⁴ Joseph S. Bermudez Jr., Victor Cha and Jennifer Jun, "North Korea Launches New Ballistic Missile Submarine," *CSIS Beyond Parallel*, September 11, 2023, https://beyondparallel.csis.org/north-korea-launches-new-ballistic-missile-submarine/.

complex security challenges. Among those countries, Russia and North Korea continued to notably intensify their rhetoric on the strategic value of their nuclear arsenals throughout 2024, with a pronounced emphasis on their nuclear capabilities.

While continuing its invasion of Ukraine, Russia repeated its nuclear intimidation in 2024. The following was reported regarding the nuclear intimidation by Russia.¹⁵⁵

- On January 11, Former Russian President Dmitry Medvedev, now deputy chairman of Russia's Security Council, said that some Ukrainian military commanders were considering hitting missile launch sites inside Russia with Western-supplied long-range missiles.¹⁵⁶ Medvedev said that "this means there is a risk that item 19 of the 'Basis of State Policy in the Field of Nuclear Deterrence' will be invoked."
- In his 2024 annual address, President
 Putin stated that if Western countries

sent troops to Ukraine, the possibility of nuclear war would increase. He added that Russia has "weapons that can hit targets on their territory" and that such actions would raise the threat of "conflict with the use of nuclear weapons and the destruction of civilization. Don't they get that?"¹⁵⁷

- Russia conducted military exercises using non-strategic nuclear weapons in late May and presented them as a response to NATO's actions to support Ukraine.¹⁵⁸
- On May 28, President Putin criticized the stance of the European NATO member states, who indicated that they would tolerate Ukrainian use of Western-supplied weapons on Russian territory, saying that it was playing with fire and that it could lead to a global conflict.¹⁵⁹
- On June 20, President Putin reiterated that Russia's strategic nuclear weapons are in a state of full combat readiness.¹⁶⁰ Arguing that Western countries kept developing their nuclear capabilities, he said that Russia was

¹⁵⁵ Since the beginning of Russia's full-scale invasion of Ukraine in February 2022, Russia has reportedly made over 200 threats of nuclear escalation in connection with the invasion. See Project on Nuclear Issues, "Nuclear Signaling During the War in Ukraine," Center for Strategic and International Security, https://nuclearrussiaukraine.csis.org/.

¹⁵⁶ "Russia's Medvedev Warns of Nuclear Response If Ukraine Hits Missile Launch Sites," *Reuters*, January 11, 2024, https://www.reuters.com/world/europe/russias-medvedev-warns-nuclear-response-if-ukraine-hits-missile-launch-sites-2024-01-11/.

¹⁵⁷ Andrew Stanton, "China Issues Warning on Risks' of Nuclear War," *Newsweek*, March 1, 2024, https://www.newsweek.com/china-issues-warning-nuclear-war-risks-1875130.

¹⁵⁸ Xiaodon Liang, "Russia Links Nonstrategic Nuclear Exercises to Threats," *The Arms Control Association*, June 2024, https://www.armscontrol.org/act/2024-06/news/russia-links-nonstrategic-nuclear-exercises-threats.

¹⁵⁹ Vladimir Soldatkin, Guy Faulconbridge, "Putin Warns West Not to Let Ukraine Use Its Missiles to Hit Russia," *Reuters*, May 29, 2024, https://www.reuters.com/world/europe/putin-warns-west-not-let-ukraine-use-its-missiles-hit-russia-2024-05-28/.

¹⁶⁰ "Sanctions And Peace Initiatives: What Putin Told Reporters in Hanoi," *TASS*, June 21, 2024, https://tass.com/politics/1806257.

considering revising its military doctrine, which sets out the conditions for the use of nuclear weapons.

- On June 23, it was reported that Russia could shorten the decision-making time outlined in its official policy for the use of nuclear weapons if it perceives an increase in threats, according to the chairman of parliament's defense committee.¹⁶¹
- On September 1, Deputy Foreign Minister Ryabkov told that there is a "clear intent" to make changes to the nuclear doctrine, adding that the decision is "connected to our Western adversaries' escalation course" in connection with the Ukraine conflict."¹⁶²
- In response to the fact that Ukraine attacked the Russian region of Bryansk on November 21 with the Army Tactical Missile System (ATACMS) provided by the United States, Russian Foreign Minister Lavrov stated that he viewed this as a signal of the worsening situation and

that he would take corresponding measures.¹⁶³

On November 21, Russia attacked Ukraine using a new MIRV-capable IRBM, the Oresnik-1. President Putin said that it was an experimental launch.¹⁶⁴

On September 25, President Putin announced the revision of the doctrine (Basic Principles) regarding the use of nuclear weapons at a meeting of the Russian Security Council.¹⁶⁵ He stated that the categories of states and military alliances targeted by nuclear deterrence, as well as the list of military threats that nuclear deterrence aims to neutralize, were being expanded.¹⁶⁶ The document entitled "Fundamentals of the State Policy of the Russian Federation in the Area of Nuclear Deterrence" was adopted on November 19.167 The following points were noted as changes from the previous version of Russia's nuclear doctrine.

Aggression against the Russian
 Federation and/or its allies by any non-

¹⁶¹ Guy Faulconbridge and Lidia Kelly, "Russia Could Reduce Decision Time for Use of Nuclear Weapons, Lawmaker Says," *Reuters*, June 23, 2024, https://www.reuters.com/world/europe/russian-lawmaker-warns-moscow-may-change-timing-use-nuclear-weapons-2024-06-23/.

¹⁶² Natalie Venegas, "Russia Warns Kremlin Changing Nuclear War Policy in Response to West," *Newsweek*, September 2, 2024, https://www.newsweek.com/russia-warns-kremlin-changing-nuclear-war-policy-response-west-1947260.

¹⁶³ "Lavrov Says Ukrainian Attack on Russia with U.S. Missiles Is a Western Escalation," *Reuters*, November 19, 2024, https://www.reuters.com/world/europe/lavrov-says-ukrainian-attack-russia-with-us-missiles-is-western-escalation-2024-11-19/.

¹⁶⁴ Anastasiia Malenko, Tom Balmforth and Max Hunder, "Russia Fired New Ballistic Missile at Ukraine, Putin Says," *Reuters,* November 22, 2024, https://www.reuters.com/world/europe/russia-launches-intercontinental-ballistic-missile-attack-ukraine-kyiv-says-2024-11-21/.

¹⁶⁵ "Full Text of Putin Speech on Nuclear Doctrine Change," *Mirage News*, September 26, 2024, https://www.miragenews.com/full-text-of-putin-speech-on-nuclear-doctrine-1325181/.

¹⁶⁶ Ibid.

¹⁶⁷ "Fundamentals of State Policy of the Russian Federation on Nuclear Deterrence," Ministry of Foreign Affairs of the Russian Federation, https://www.mid.ru/en/foreign_policy/international_safety/1434131/.

nuclear state with the participation or support of a nuclear state is considered as their joint attack.

- The Russian Federation reserves the right to deploy nuclear weapons in response to the employment of nuclear and/or other types of weapons of mass destruction against itself and/or its allies, as well as in the event of aggression against the Russian Federation and/or the Republic of Belarus as participants in the Union State with the employment of conventional weapons, which creates a critical threat to their sovereignty and/or territorial integrity.
- The conditions that enable the possibility of nuclear weapons employment by the Russian Federation are as follows:
 - a) receipt of reliable data on the launch of ballistic missiles attacking the territories of the Russian Federation and/or its allies;
 - b) employment of nuclear or other types of weapons of mass destruction by an adversary against the territories of the Russian Federation and (or) its allies, against facilities and (or) military formations of the Russian Federation located outside its territory;
 - c) actions by an adversary affecting elements of critically important state or military infrastructure of the Russian Federation, the disablement of which would disrupt response

actions by nuclear forces;

- aggression against the Russian Federation and (or) the Republic of Belarus as participants in the Union State with the employment of conventional weapons, which creates a critical threat to their sovereignty and (or) territorial integrity;
- e) receipt of reliable data on the massive launch (take-off) of air and space attack means (strategic and tactical aircraft, cruise missiles, unmanned, hypersonic and other aerial vehicles) and their crossing of the state border of the Russian Federation.

During this time, Russia conducted an exercise on October 29 that envisaged the use of strategic nuclear forces. It included the launch of the ICBM Yars, SLBMs Sineva and Bulava, with the strategic bomber Tu-95 also participating.¹⁶⁸

Russia's nuclear intimidation was strongly condemned at the 2024 NPT PrepCom and the UNGA First Committee meetings, mainly by Western countries. For instance, the United States said that "Russia, an NPT nuclear-weapon state and treaty depository, is engaged in an illegal war against its non-nuclear weapon state neighbor. It has violently seized Ukraine's peaceful nuclear facilities; engaged in reckless nuclear rhetoric; violated provisions of the New START Treaty; and may be contemplating what it is legally obligated not to do – putting a nuclear weapon in outer space."¹⁶⁹ Japan

¹⁶⁸ Guy Faulconbridge and Mark Trevelyan, "Russia Fires Missiles to Simulate 'Massive' Response to a Nuclear Attack," *Reuters*, October 30, 2024, https://www.reuters.com/world/europe/putin-orders-strategic-nuclear-training-exercise-2024-10-29/.

¹⁶⁹ "Statement by the United States," General Debate, First PrepCom for the 11th NPT RevCon, July 22,

also said that "we must extend the record of the non-use of nuclear weapons. Nuclear weapon States must honor their crucial commitment that 'a nuclear war cannot be won and must never be fought', as stated in the P5 Joint Statement issued in January 2022. In this context, it is also increasingly relevant to discuss ways to reduce nuclear risks. Japan encourages nuclear-weapon States to promote meaningful discussions regarding risk reduction."¹⁷⁰

Russia responded by stating the following:

"This is an objective reality that in the current situation, Russia has to retain nuclear deterrence as an integral component of its efforts to address specific external threats, which continue to increase, affecting our country's vital interests. As a consequence, while the provisions of Russia's doctrines evolve, the factor of nuclear deterrence keeps playing an important role. Nevertheless, we strictly outline the extreme circumstances of self-defense in which Russia reserves the right to nuclear response."¹⁷¹

North Korea reiterated in 2024 that it would expand the role of nuclear weapons in its national security known as warfighting and actively conducted missile tests and drills of various types.¹⁷² On October 8, Kim Jong Un also threatened to use nuclear weapons to destroy South Korea if attacked. He said that "the path to becoming a military power and a nuclear power will accelerate."¹⁷³

China, which has been criticized for the rapid buildup of its nuclear capabilities, has sparked concerns due to the growing role of nuclear weapons in its national security. However, as will be discussed below, China maintains that its nuclear strategy has not changed, including its policy of no first use of nuclear weapons and providing negative security assurances to non-nuclear weapon states. President Xi Jinping inspected the Chinese People's Liberation Army's rocket forces on October 17, 2024, and called for "full strengthening of training and combat readiness" and "forcefully defending the nation's strategic security and core interests."174

Pranay Vaddi, senior director for arms control and non-proliferation at the U.S. National Security Council (NSC), said in June that the new nuclear employment guidance was the first to examine in detail the readiness of the United States in order

^{2024.}

¹⁷⁰ "Statement by Japan," Cluster 1, First PrepCom for the 11th NPT RevCon, July 25, 2024.

¹⁷¹ "Statement by Russia," Cluster 1, First PrepCom for the 11th NPT RevCon, July 25, 2024.

¹⁷² "Report on 6th Enlarged Plenary Meeting of 8th WPK Central Committee," KCNA, January 1, 2023, http://www.kcna.co.jp/item/2023/202301/news01/20230101-18ee.html.

¹⁷³ Hyung-Jin Kim, "North Korea's Kim Again Threatens to Use Nuclear Weapons Against South Korea and US," *AP*, October 8, 2024, https://apnews.com/article/north-korea-kim-nuclear-weapons-5812004982995598bd8c38e0b902dfae.

¹⁷⁴ "Xi Urges Strategic Missile Troops to Enhance Deterrence, Combat Capabilities," The State Council of the People's Republic of China, October 19, 2024, https://english.www.gov.cn/news/202410/19/ content_WS67136968c6d0868f4e8ec184.html.

to respond to a simultaneous or sequential nuclear crisis involving a combination of nuclear and non-nuclear weapons. The new strategy emphasizes the need to deter simultaneously Russia, China, and North Korea.¹⁷⁵ After his resignation from the Pentagon in August, Vipin Narang revealed that the United States had conducted a year-long study of nuclear force requirements, notably considering how to implement a potential future increase in the number of deployed warheads. He added that Pentagon officials were considering "options for future increases in launcher capacity and additional deployed warheads in the land, sea, and air theaters of war."176

B) Commitment to no first use, "sole purpose," and related doctrines

In 2024, no NWS/nuclear-armed state changed or altered its policy regarding no first use (NFU) or the "sole purpose" of nuclear weapons. Among the NWS, China remains the only one to have officially declared a NFU policy. It reaffirmed its commitment in 2024. The other four NWS have declined to embrace NFU or "sole purpose" policies.

In February 2024, China urged the major NWS/nuclear-armed states to negotiate a treaty on the no first use of nuclear weapons or to make a political statement

in this regard.

At the 2024 NPT PrepCom, China proposed that nuclear-weapon states negotiate and conclude a treaty on the "mutual no-first-use of nuclear weapons" or to issue a political statement in this regard. It has put forward potential elements of the treaty or political statement.¹⁷⁷ China also submitted a Working Paper on NFU, urging that "Each State Party undertakes not to be the first to use nuclear weapons against another State Party at any time and under any circumstances. Each State Party undertakes to support the early conclusion of a treaty on not using or threatening to use nuclear weapons against non-nuclear weapon States or nuclear-weapon-free zones."178

The United States argued that "[t]he PRC's actions, in particular its rapid and opaque nuclear weapons build-up, raise questions about Beijing's already ambiguous, stated "no first use" policy and its nuclear doctrine more broadly, calling into question what such an initiative aims to achieve. The PRC, to date, has resisted substantive engagement to answer these questions. We also continue to have concerns about how its proposed no first use treaty would operate in practice, including with respect to

¹⁷⁵ David E. Sanger, "Biden Approved Secret Nuclear Strategy Refocusing on Chinese Threat," *The Japan Times,* August 21, 2024, https://www.japantimes.co.jp/news/2024/08/21/world/politics/us-secret-nuclear-strategy-china/.

¹⁷⁶ "China Takes Over P5 Process, Repeats No-First-Use Call with African States," *The Arms Control Association*, September 12, 2024, https://www.armscontrol.org/blog/2024-09/nuclear-disarmament-monitor.

 ¹⁷⁷ "Statement by China," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.
 ¹⁷⁸ NPT/CONF.2026/PC.II/WP.33.

verification."¹⁷⁹ Vladimir Yermakov, Director of the Non-Proliferation and Arms Control Department of the Russian Ministry of Foreign Affairs, also declared that there is no need to discuss the Chinese proposal and that they would not discuss it with the United States.¹⁸⁰

Regarding the other nuclear-armed states, India maintains an NFU policy despite reserving the option of nuclear retaliation in response to a major biological or chemical attack. In addition, it was reported that India had successfully tested MIRV technology for ICBMs in March 2024. Some analysts say this technology can increase the risk of preemptive nuclear use in a conflict.¹⁸¹ Pakistan, which has developed short-range nuclear weapons to counter the "Cold Start doctrine" developed by the Indian Army, does not exclude the possibility of using nuclear weapons first against an opponent's conventional attack.

North Korea, in its law on "Policy on Nuclear Forces" enacted in September 2022, indicated that it could use nuclear weapons first.¹⁸² In recent years, North Korean leaders have repeatedly and strongly mentioned the possibility of nuclear first use.

C) Negative security assurances

Negative security assurances (NSAs) are commitments by nuclear weapon states that nuclear weapons will not be used or threatened against non-nuclear weapons states.

Russia revised the conditions for negative security assurances in the new nuclear doctrine adopted by President Putin in November 2024. Until then, Russia had stated that it would not use or threaten to use nuclear weapons against non-nuclear weapon states that are parties to the NPT, except in the case of an attack by a nonnuclear weapon state allied with a nuclear weapon state. The new doctrine states that "[a]ggression against the Russian Federation and (or) its allies by any nonnuclear state with the participation or support of a nuclear state shall be considered as their joint attack",¹⁸³ leaving open the possibility of the use of nuclear weapons.

Western countries have criticized Russia for its invasion of Ukraine, which involves Russian nuclear blackmail, as a violation of negative security assurances and the

¹⁷⁹ "Statement by the United States," Cluster 1 Specific Issue, Second PrepCom for the 11th NPT RevCon, July 25, 2024.

¹⁸⁰ "No Plans for Russia-US Debate on China's Non-Aggression Idea for Nuclear Powers — MFA," *TASS*, April 12, 2024, https://tass.com/politics/1774203.

¹⁸¹ Huma Rehman, "What India's MIRV Test Adds to the 'Strategic Trilemma' in South Asia," *Bulletin of the Atomic Scientists*, May 3, 2024, https://thebulletin.org/2024/05/what-indias-mirv-test-adds-to-the-strategic-trilemma-in-south-asia/.

¹⁸² "Law on DPRK's Policy on Nuclear Forces Promulgated", KNCA Watch, September 9, 2022, https://kcnawatch.org/newstream/1662687258-950776986/law-on-dprks-policy-on-nuclear-forcespromulgated/.

¹⁸³ "Fundamentals of State Policy of the Russian Federation on Nuclear Deterrence," Ministry of Foreign Affairs of the Russian Federation, December 3, 2024, https://www.mid.ru/en/foreign_policy/international_safety/1434131/.

Budapest Memorandum that Russia and other countries concluded with Ukraine in 1994. Russia has refuted this, saying that it has not threatened to use nuclear weapons against Ukraine.¹⁸⁴

There was no change in the negative security assurances of the nuclear weapon states, except for Russia. Apart from China, which consistently declares that it will provide unconditional security assurances, the nuclear weapon states attach certain conditions to such assurances.

At the 2024 NPT PrepCom, the United States stated that "the United States maintains a negative security assurance that it will not use or threaten to use nuclear weapons against non-nuclear weapons states that are party to the NPT and are in compliance with their nuclear non-proliferation obligations."¹⁸⁵

The United Kingdom has also declared a similar negative security assurance to the United States, but its 'Integrated Review of Security, Defence, Development and Foreign Policy'' states that the United Kingdom ''reserve[s] the right to review this assurance if the future threat of weapons of mass destruction, such as chemical and biological capabilities, or emerging technologies that could have a comparable impact, makes it necessary."¹⁸⁶

France reiterated its commitment to the

NSAs by referring to the declaration of April 6, 1995, whereby "France reaffirmed for the benefit of all non-nuclear-weapon States party to the NPT and complying with their commitments, the security assurances it had given as early as 1982. The Security Council took note of this in resolution 984 (1995) and reaffirmed it in resolutions 1887 (2009) and 2310 (2016). France considers this commitment to be legally binding, and therefore feels fully bound by it, and intends to implement it in good faith [...]. These commitments do not affect the right to self-defense, as enshrined in Article 51 of the UN Charter,"187

As written in the previous Hiroshima Reports, while one purpose of the NSAs provided by NWS to NNWS is to alleviate the imbalance of rights and obligations between NWS and NNWS under the NPT, India, Pakistan and North Korea have also offered NSAs to NNWS. None of these countries significantly changed their NSA policies in 2024. India declared that it would not use nuclear weapons against NNWS, with the exception that "in the event of a major attack against India, or Indian forces anywhere, by biological or chemical weapons, India will retain the option of retaliating with nuclear weapons." Pakistan has declared an unconditional NSA. In addition, North Korea stipulated in its law on Policy on Nuclear Weapons in 2022 that it "shall

¹⁸⁴ See, for example, "Statement by Russia in Exercise of the Right of Reply," 10th NPT RevCon, August 2, 2022.

¹⁸⁵ "Statement by the United States," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 25, 2024.
¹⁸⁶ United Kingdom, *Global Britain in a Competitive Age*.

¹⁸⁷ "Statement by France," Cluster 1, Second PrepCom for 11th NPT RevCon, July 25, 2024.

neither threaten non-nuclear weapons states with its nuclear weapons nor use nuclear weapons against them unless they join aggression or attack against the DPRK in collusion with other nuclear weapons states."

South Korea submitted in the NPT PrepCom that "[w]e share the view that an NSA by the Nuclear-Weapon States to Non-Nuclear Weapon States can serve as an intermediate step toward realizing our ultimate goal of a world free of nuclear weapons [...]. However, an NSA should be applied only to those who faithfully comply with the NPT as Non-Nuclear Weapon States. My delegation believes this is a matter of principle to sustain and reinforce the Treaty's purposes and objectives."¹⁸⁸

Apart from the protocols to nuclearweapon-free zone (NWFZ) treaties, NWS have not provided legally binding NSAs. At the NPT PrepCom, the NAM countries reiterated the argument that "[p]ending the total elimination of nuclear weapons, the Group calls for the early commencement of negotiations on effective, universal, unconditional, nondiscriminatory, irrevocable and legally binding negative security assurances to all Non-Nuclear Weapon States by all the Nuclear Weapon States against the use or threat of use of nuclear weapons under all circumstances as a matter of high priority."189 In addition, China stated at the 2024 Conference on Disarmament (CD) that "the Conference on Disarmament should strengthen its work and come up with a roadmap and timetable to promote the early conclusion of an international legal instrument on negative security assurance. China calls on other nuclear weapons states to respond positively and support this proposal."¹⁹⁰ At the NPT Preparatory Committee meeting held the same year, China called on other nuclear weapons states to declare unconditional negative security assurances before concluding an international legal document.¹⁹¹ However, the other four nuclear weapon states have consistently rejected this proposal.¹⁹²

At the 2024 UNGA, a resolution titled "Conclusion of effective international arrangements to assure non-nuclearweapon states against the use or threat of use of nuclear weapons" was adopted. The resolution "[considers that] until nuclear disarmament is achieved on a universal basis, it is imperative for the international community to develop effective measures and arrangements to

¹⁸⁸ "Statement by Republic of Korea," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 25, 2024.

¹⁸⁹ "Statement by NAM" General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

¹⁹⁰ "Remarks by Director-General Mr. SUN Xiaobo at the High-Level Segment of the Conference on Di sarmament," Ministry of Foreign Affairs of China, February 29, 2024, https://www.fmprc.gov.cn/eng/w jb/zzjg_663340/jks_665232/kjfywj_665252/202406/t20240606_11405418.html.

¹⁹¹ NPT/CONF.2026/PC.II/WP.34.

¹⁹² France has taken the position that "it considers its commitments to be legally binding and has stated as such" in its unilateral statement of April 1995 on the guarantee of the security of non-nuclear-weapon States. NPT/CONF.2015/PC.III/14, April 25, 2014.

ensure the security of non-nuclearweapon States against the use or threat of use of nuclear weapons from any quarter."¹⁹³ The voting behavior of countries surveyed in this project on this resolution is as follows:

117 in favor (Brazil, China, Egypt, India, Indonesia, Iran, Japan, Kazakhstan, Mexico, Pakistan, Saudi Arabia, Syria and others); 0 against; 62 abstentions (Australia, Austria, Canada, France, Germany, Israel, South Korea, North Korea, the Netherlands, New Zealand, Norway, Poland, Russia, South Africa, Sweden, Switzerland, Turkey, the United Kingdom, the United States and others)

D) Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones

The protocols to the NWFZ treaties include the provision of legally binding NSAs. However, as of the end of 2024, only the Protocol of the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (Treaty of Tlatelolco) has been ratified by all NWS, as shown in Table 1-5. No new progress regarding additional ratifications by NWS was made in 2024.

Regarding the Protocol to the Southeast Asia NWFZ (SEANWFZ) Treaty (Bangkok Treaty), which has not been signed by any of the five NWS, ASEAN stated the following at the NPT PrepCom:

ASEAN welcomes the adoption by the General Assembly of the resolution on the Bangkok Treaty on December 4, 2023 by consensus. We are committed to further enhance and strengthen the implementation of the Bangkok Treaty by implementing the Plan of Action for the period 2023-2027 as adopted in Phnom Penh in 2022, with a renewed commitment and a stronger emphasis on concrete actions, including to continue efforts among State Parties and between States Parties and the NWS to resolve all outstanding issues in accordance with the objectives and principles of the SEANWFZ Treaty, and in line with ASEAN's position as outlined in the Joint Communique of the 56th ASEAN Foreign Ministers' Meeting.¹⁹⁴

The five NWS have expressed their intention to sign the protocol, and it has been reiterated that consultations between the parties to the treaty and the five NWS are continuing. China has stated that it will "take the initiative in signing the Southeast Asia Nuclear-Weapon-Free Zone Treaty Protocol" at the CD in 2024.¹⁹⁵ At the 2024 NPT Preparatory Committee, the United Kingdom expressed its intention

¹⁹³ A/RES/79/17, December 2, 2024.

¹⁹⁴ "Statement by the Philippines on Behalf of the ASEAN," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

¹⁹⁵ "Remarks by Director-General Mr. SUN Xiaobo at the High-Level Segment of the Conference on Dis armament," Ministry of Foreign Affairs of China, February 29, 2024, https://www.fmprc.gov.cn/eng/wj b/zzjg_663340/jks_665232/kjfywj_665252/202406/t20240606_11405418.html.

to sign and ratify the Bangkok Treaty.¹⁹⁶ The United States also stated that it would "continue to consult with the parties to the Southeast Asia Nuclear-Weapon-Free Zone Treaty and sign and ratify the amended protocol to the treaty as soon as possible.¹⁹⁷ However, it is not clear how far these initiatives have actually progressed.

Some NWS have added interpretationswhich are substantially reservations—to the protocols to the NWFZ treaties when signing or ratifying them. The NAM and NAC, as well as states parties to the NWFZ treaties, have called for the withdrawal of any related reservations or unilateral interpretative declarations that are incompatible with the object and purpose of such treaties. For instance, the NAM countries argued at the 2024 NPT PrepCom that "[t]he Group reaffirms the important role of the nuclear-weapon-free zones in fulfilling the objectives of the Treaty and supports the full operation and strengthening of treaties establishing such zones, including through ratification of their relevant protocols and removal of any and all reservations and interpretative declarations incompatible with their object and purpose."¹⁹⁸ The Agency for the Prohibition of Nuclear Weapons in Latin

America and the Caribbean (OPANAL) also called for appropriate responses to the protocols of the nuclear-weapon-freezone treaties by nuclear-weapon states and stated: "OPANAL Member States strongly support the establishment of new nuclear-weapon-free zones, through arrangements freely arrived at among States of the respective regions, in line with Article VII of the NPT, which must remain a priority for the international community. However, we should not take existing nuclear-weapon-free zones for granted. It is the responsibility of both the States that comprise them and the international community as a whole to ensure their sustainability and proper functioning."199

In response to the above argument, at the CD in 2024, China called upon nuclearweapon states to sign and ratify the protocols to Nuclear-Weapon-Free Zone Treaties as soon as possible.²⁰⁰ During the NPT PrepCom, Russia stated that "[e]stablishing NWFZs and nuclearweapons States' signing legally binding protocols on security assurances to the parties to such zones as a meaningful factor strengthening international security

¹⁹⁶ "United Kingdom Statement on Cluster 2 issues," Cluster 2, Second PrepCom for the 11th NPT RevCon, July 26, 2024.

¹⁹⁷ "Statement by the United States," Cluster 2, Second PrepCom for the 11th NPT RevCon, July 29, 2024.

¹⁹⁸ "Statement by Group of the Non-Aligned States Parties," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

¹⁹⁹ "Statement by the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL)," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

²⁰⁰ "Remarks by Director-General Mr. SUN Xiaobo at the High-Level Segment of the Conference on Di sarmament," Ministry of Foreign Affairs of China, February 29, 2024, https://www.fmprc.gov.cn/eng/w jb/zzjg_663340/jks_665232/kjfywj_665252/202406/t20240606_11405418.html.

and stability."²⁰¹ The United States also stated that "the United States wishes to reiterate its full support for nuclearweapon-free-zone treaties as a complement to the NPT and a means to advance security and disarmament on a regional basis."²⁰² However, these statements were not accompanied by any substantive action. In 2024, there was still no positive attitude from the nuclearweapon states regarding the protocols of the nuclear-weapon-free zone treaties.

E) Relying on extended nuclear deterrence

Russia and Belarus

In the nuclear doctrine that Russia adopted in November 2024, the amendment states that Russia may resort to using nuclear weapons if there is a "critical threat" to its "sovereignty and/or territorial integrity" and that of its ally the Republic of Belarus.²⁰³ Russia has previously transferred tactical nuclear weapons to Belarus, and under the new amendment, any threat to its neighbor Belarus, which is under Russian protection, will permit Russia to use its

nuclear arsenal. In January 2024, it was reported that Belarus had amended its military doctrine to permit the use of Russian nuclear weapons for the first time.²⁰⁴ Belarusian Defense Minister Viktor Khrenin mentioned that "[t]he deployment of tactical nuclear weapons on the territory of the Republic of Belarus is considered an important measure of the preventive deterrence for potential adversaries from unleashing armed aggression against the Republic of Belarus."205 A U.S. research institute reported that a recent upgrade of a military depot in central Belarus, which included additional security perimeters and an access point, could be intended to house Russian nuclear warheads for Belarus' Russia-supplied Iskander missile launchers.²⁰⁶

In April 2024, President Alexander Lukashenko stated that the deployment of Russian tactical nuclear weapons in Belarus had been completed in October 2023 and that the terms of use of the nuclear weapons were not specified but would be decided in consultation with

²⁰¹ "Statement by Russia," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.

²⁰² "Statement by the United States," Cluster 2, First PrepCom for the 11th NPT RevCon, July 29, 2024.

²⁰³ "Fundamentals of State Policy of the Russian Federation on Nuclear Deterrence," Ministry of Foreign Affairs of the Russian Federation, December 3, 2024, https://www.mid.ru/en/foreign_policy/international_safety/1434131/.

²⁰⁴ Arpan Rai, "Russia Ally Belarus to Permit Use of Nculear Weapons for First Time in New Military Ru lebook," *The Independent*, January 17, 2024, https://www.independent.co.uk/news/world /europe/belaru s-nuclear-weapons-russia-poland-doctrine-b2479884.html.

²⁰⁵ Mariya Knight and Chris Lau, "Belarus Adopts New Military Doctrine Involving Nuclear Weapons," CNN, January 20, 2024, https://edition.cnn.com/2024/01/19/europe/belarus-adopts-doctrine-involvin g-nuclear-weapons-intl-hnk/index.html.

²⁰⁶ Hans Kristensen and Matt Korda, "Depot in Belarus Shows New Upgrades Possibly for Russian Nucl ear Warhead Storage," *Federation of American Scientists*, March 14, 2024, https://fas.org/publication/depot-in-belarus-shows-new-upgrades-possibly-for-russian-nuclear-warhead-storage/.

President Putin.²⁰⁷ President Lukashenko stressed claims that Belarus faces a NATO threat, using this argument to justify the deployment of nuclear weapons.²⁰⁸ In December 2024, Russia and Belarus signed a mutual defense pact that spells out the principle of using nuclear and conventional weapons. President Putin said that "since we have today signed an agreement on security guarantees using all available forces and means, I consider the deployment of such systems as the Oreshnik on the territory of the Republic of Belarus to be feasible."²⁰⁹ President Lukashenko said Belarus had accepted dozens of Russian nuclear weapons and would prepare facilities for the planned deployment of Russia's latest hypersonic ballistic missiles.²¹⁰

At the 2024 NPT Preparatory Committee, Belarus and Russia, citing the fact that U.S. nuclear weapons are deployed at military bases in Europe under NATO's nuclear sharing policy, argued that the deployment of nuclear weapons in Belarus is intended for self-defense against NATO expansion and that it is not appropriate to criticize Belarus.

In May, it was reported that Belarus has begun checks on the readiness of its army to deploy tactical nuclear weapons, simultaneously with preparations for a nuclear drill carried out by Russia. During the inspection, "the entire range of activities from planning, preparation and use of strikes with tactical nuclear weapons were checked at an Iskander missile division and a squadron of Su-25 aircraft."211 The second phase of Russia's tactical nuclear exercises was conducted in June. Belarusian forces reportedly participated in the exercises, which are designed to simulate the actual use of tactical nuclear weapons.²¹² According to the Russian Defense Ministry, the Russian military trained to arm and deploy Iskander missiles while the Air Force trained to arm the hypersonic missile Kinzal in the first phase of the training. The second phase was a joint training of Russian and Belarusian units for the combat use of non-strategic nuclear

²⁰⁷ "Lukashenko on How Belarus Can Respond to Aggression Coming from the West," *Belarus Segodnya*, April 25, 2024, https://www.sb.by/en/lukashenko-on-how-belarus-can-respond-to-aggression-coming-f rom-the-west.html.

²⁰⁸ Mark Trevelyan, "Lukashenko Talks Up Threats to Belarus to Justify 'Nuclear Deterrence," *Reuters*, A pril 25, 2024, https://www.reuters.com/world/europe/lukashenko-talks-up-threats-belarus-justify-nucle ar-deterrence-2024-04-25/.

²⁰⁹ Lucy Papachristou and Dmitry Antonov, "Putin Says New Oreshnik Hypersonic Missile Could Be De ployed in Belarus," *Renters*, December 7, 2024, https://www.reuters.com/world/europe/russia-belarus-si gn-treaty-security-guarantees-kremlin-says-2024-12-06/.

²¹⁰ "Belarus Has Dozens of Russian Nuclear Weapons and Is Ready for Its Newest Missile, Its Leader Sa ys," *AP*, December 11, 2024, https://apnews.com/article/russia-belarus-lukashenko-putin-nuclear-oresh nik-ukraine-0cb678c1d0144fb6b372693a4ec6af4d.

²¹¹ "Belarus Conducts Tactical Nuclear Inspection Together with Russia," *Reuters*, May 7, 2024, https://w ww.reuters.com/world/europe/belarus-conducts-tactical-nuclear-inspection-together-with-russia-2024-0 5-07/.

²¹² "Belarus Says It Is Joining Nuclear Exercise with Russia," *Reuters,* June 10, 2024, https://www.reuters. com/world/europe/belarus-says-it-is-joining-nuclear-exercises-with-russia-2024-06-10/.

weapons.²¹³

<u>NATO</u>

Currently, it is estimated that the United States deploys approximately 100 B-61 nuclear gravity bombs in five NATO countries (Belgium, Germany, Italy, the Netherlands and Turkey), with which it maintains nuclear sharing arrangements. NATO's Nuclear Planning Group (NPG) also supports the U.S. extended nuclear deterrence. In the NATO Strategic Concept adopted in June 2022, there was a heightened emphasis on the role of nuclear deterrence compared to the previous version adopted in 2010, particularly concerning extended nuclear deterrence.²¹⁴ In 2024, NATO members reaffirmed the significance of extended nuclear deterrence for NATO's security strategy.

In January 2024, it was reported that the United States was upgrading facilities at the Lakenheath Air Force Base in Suffolk England, United Kingdom.²¹⁵ According to *The Times*, a document on the Pentagon procurement website states that the Pentagon has ordered necessary equipment for Lakenheath Air Force Base, including bulletproof shields to protect "high-value assets". Construction of new U.S. military barracks for potential security missions, which is the term believed to be used within the Pentagon to refer to nuclear weapons management, was scheduled to begin in June. These plans would be consistent with an intention ultimately to redeploy U.S. nuclear weapons to Royal Air Force (RAF) Lakenheath for the first time in 15 years possibly in the event that nuclear weapons are withdrawn from the Incirlik Air Base in Turkey.²¹⁶

In March 2024, Sweden officially joined NATO, which now covers the whole of the Nordic region, bringing the number of member countries to 32. Prime Minister Kristensen mentioned in May that, in wartime, there was a possibility that Sweden would not reject the introduction of nuclear weapons into the country by the United States and other countries.²¹⁷ Prime Minister Stubb of Finland, which joined NATO before Sweden, emphasized that NATO's nuclear deterrent must be a reality for Finland, and stated that "NATO effectively provides our country with three

²¹³ Guy Faulconbridge, "Russia Begins Second Stage of Tactical Nuclear Weapon Drills with Belarus," *Re uters*, June 12, 2024, https://www.reuters.com/world/europe/russia-belarus-start-second-stage-tactical-n uclear-drills-ministry-says-2024-06-11/.

²¹⁴ NATO, Strategic Concept, June 29, 2022, p. 8.

²¹⁵ "US to Keep Nuclear Weapons in UK for First Time in 15 Years," *The Times*, January 27, 2024, https: //www.thetimes.com/world/article/us-to-keep-nuclear-weapons-in-uk-for-first-time-in-15-years-c0626r v78.

²¹⁶ Hans Kristensen, "NATO Tactical Nuclear Weapons Exercise and Base Upgrades," *Federation of Ameri can Scientists*, October 14, 2024, https://fas.org/publication/nato-tactical-nuclear-weapons-exercise-and-b ase-upgrades/.

²¹⁷ Charles Szumski, "Swedish PM Open to Hosting Nuclear Weapons on Home Soil in Case of War," *E uractiv*, May 14, 2024, https://www.euractiv.com/section/politics/news/swedish-pm-open-to-hosting-nu clear-weapons-on-home-soil-in-case-of-war/.

deterrents: military forces, missiles, and the nuclear deterrent of the United States.²¹⁸

In April 2024, Polish President Andrzej Duda said that "[i]f our allies decide to deploy nuclear weapons as part of nuclear sharing on our territory as well, in order to strengthen the security of NATO's eastern flank, we are ready for it."²¹⁹ On April 26, President Duda said: "As we understand it, the entire NATO area must be adequately and sufficiently protected. For this reason, it makes a great deal of sense to move nuclear weapons systems to the eastern front of NATO. We have declared that we are prepared to accept these weapons as one of these [Eastern front] countries."²²⁰ On the other hand, the Secretary-General of NATO stated at a joint press conference with British Prime Minister Tony Blair in Warsaw that NATO has no plans to change its current nuclear weapons deployment posture and deploy nuclear weapons in Poland.²²¹

NATO held its annual nuclear exercise

"Steadfast Noon" from October 14 to October 24. More than 60 aircraft took part in training flights over Western Europe. It involved fighter jets capable of carrying U.S. nuclear warheads but no real nuclear weapons. NATO's nuclear exercise is a routine and recurring training activity that takes place every October. Steadfast Noon involves 2,000 military personnel from eight airbases and a variety of aircraft types, including nuclear-capable jets, bombers, fighter escorts, refueling aircraft and planes capable of reconnaissance and electronic warfare.²²² Thirteen member states participated in the military exercise, with Finland, as a new member, also dispatching fighter jets.²²³

Some NATO countries in Europe have also expressed an interest in the European Nuclear Deterrence Initiative. French President Macron has stated that "credible European defense" should go beyond what the U.S.-led NATO can provide, and has called for a debate on the role that French nuclear deterrence could play in the security of the European continent.²²⁴

²¹⁸ Anne Kauranen, "NATO's Nuclear Deterrent Must Be Real for Finland, Says New President," *Reuters*, March 2, 2024, https://www.reuters.com/world/europe/finland-inaugurates-alexander-stubb-president-nato-era-2024-03-01/.

²¹⁹ Claudia Chiappa, "Poland: We're Ready to Host Nuclear Weapons," *Politico*, April 22, 2024, https://www.politico.eu/article/poland-ready-host-nuclear-weapons-andrzej-duda-nato/.

²²⁰ "Lithuania Backs Poland Leader's Bid to Host NATO Nuclear Arms," *Barron's*, April 26, 2024, https://www.barrons.com/news/lithuania-backs-poland-leader-s-bid-to-host-nato-nuclear-arms-19a9464 1.

²²¹ "NATO Has No Plans to Deploy Nuclear Forces in Poland – Stoltenberg," *TASS*, April 26, 2024, https://tass.com/world/1779527.

²²² "NATO Holds Annual Nuclear Exercise: Steadfast Noon," NATO, October 14, 2024, https://www.nato.int/cps/en/natohq/news_229447.htm.

²²³ Hans Kristensen, "NATO Tactical Nuclear Weapons Exercise and Base Upgrades," *Federation of American Scientists*, October 14, 2024, https://fas.org/publication/nato-tactical-nuclear-weapons-exercise-and-base-upgrades/.

²²⁴ Charles Bremner "Macron Offers to Share Nuclear Weapons as Part of EU Defence Deal," *The Times*, April 29, 2024, https://www.thetimes.co.uk/article/macron-offers-share-nuclear-weapons-eu-defence-deal-h9fq95v56-; Carine Guerout and Jason Moyer, "France Wants to Extend Its Nuclear Umbrella to

German Chancellor Scholz said "We welcome the fact that the French President emphasized the European dimension of the French Force de Frappe. nuclear deterrent of his country on a European dimension. We are not only looking at nuclear deterrence, but also at powerful conventional forces, air forces, missile defense, cyber, space, and precision strike capabilities."225 On the other hand, it has been pointed out that there are issues surrounding France's expansion of its nuclear deterrent capability, such as the decision to retain or relinquish the right to use nuclear weapons, the possibility of France strengthening its nuclear weapons capability, and the determination to sacrifice France for the defense of other countries.²²⁶

Indo-Pacific

While no U.S. nuclear weapons are deployed outside American territory except in the five NATO countries mentioned above, the United States has established consultative mechanisms on extended deterrence with Japan (the Extended Deterrence Dialogue, EDD) and South Korea (the Extended Deterrence Policy Committee, EDPC).

In the joint statement issued at their April meeting, the leaders of Japan and the United States stated that "we call on our respective foreign and defense ministers to hold in-depth discussions on extended deterrence on the occasion of the next security '2+2' meeting."²²⁷ The United States and Japan then held their first ministerial meeting on extended deterrence in Tokyo on July 28, 2024, following the Security Consultative Committee (2+2) meeting of foreign and defense ministers.

During the period of the Liberal Democratic Party presidential election prior to his inauguration in October 2024, Prime Minister Shigeru Ishiba published an article entitled "The Future of Japan's Foreign Policy" in which he argued that in order to ensure deterrence against China, North Korea and Russia, an Asian version of NATO should be established. Within this framework, the "sharing and introduction of nuclear weapons" should be specifically considered.²²⁸ However,

Europe. But Is Macron Ready to Trade Paris for Helsinki?" Bulletin of the Atomic Scientists, May 10, 2024, https://thebulletin.org/2024/05/france-wants-to-extend-its-nuclear-umbrella-to-europe-but-is-macron-ready-to-trade-paris-for-helsinki/.

²²⁵ "Germany's Scholz Echoes Macron's Call for Deeper European Military Cooperation," *Reuters*, May 24, 2024, https://www.reuters.com/world/europe/germanys-scholz-echoes-macrons-call-deeper-europ ean-military-cooperation-2024-05-23/.

²²⁶ Carine Guerout and Jason Moyer, "France Wants to Extend Its Nuclear Umbrella to Europe. But Is Macron Ready to Trade Paris for Helsinki?" *Bulletin of the Atomic Scientists,* May 10, 2024, https://thebulletin.org/2024/05/france-wants-to-extend-its-nuclear-umbrella-to-europe-but-is-macron-ready-to-trade-paris-for-helsinki/.

²²⁷ "Japan-U.S. Joint Leaders' Statement: Global Partners for the Future," Ministry of Foreign Affairs of Japan, April 10, 2024, https://www.mofa.go.jp/mofaj/files/100652108.pdf.

²²⁸ "Shigeru Ishiba on Japan's New Security Era: The Future of Japan's Foreign Policy," *Hudson Institute*, September 25, 2024, https://www.hudson.org/politics-government/shigeru-ishiba-japans-new-security-

since taking office, Prime Minister Ishiba has denied any such policy change. Answering a question in the House of Councillors on December 3, Prime Minister Ishiba said that he had "stated the importance of maintaining the three non-nuclear principles and communicating with the United States about the decision-making process regarding the U.S. extended deterrence."229 He also stated in the House of Councillors Budget Committee on December 6th that "we are not currently considering the introduction of nuclear weapons." In January 2024, President Yoon Suk Yeol stated that South Korea would "complete the South Korea-U.S. extended deterrence system by the first half of this year to contain the North Korean nuclear and missile threat at its source."²³⁰ The Nuclear Consultative Group (NCG) established in 2023 between the United States and South Korea met in June, July and December. It was announced at the June meeting that the development of joint guidelines in response to a North Korean nuclear attack was virtually complete.²³¹

Furthermore, at the U.S.-ROK summit meeting in July, the joint statement

announced that the "U.S.-ROK Guidelines for Nuclear Deterrence and Nuclear Operations on the Korean Peninsula" had been approved, and that "[t]he Presidents reiterated the need to continue to make swift progress on NCG workstreams, including security protocols and expansion of information sharing; nuclear consultation processes in crises and contingencies; nuclear and strategic planning; ROK conventional support to U.S. nuclear operations in a contingency through conventional-nuclear integration; strategic communications; exercises, simulations, training, and investment activities; and risk reduction practices."232 The United States and South Korea had planned to hold the NCG meeting and a table-top exercise in December. However, both were postponed because President Yoon declared martial law just before the event, although it was lifted a few hours later.

Japan-U.S.-South Korea trilateral security cooperation has also made significant progress. In April 2024, the United States and Japan conducted a joint air drill with nuclear-capable bombers in response to a North Korean ballistic missile launch. According to the South Korean Defense

era-future-japans-foreign-policy.

²²⁹ "Press Conference by Foreign Minister Iwaya Takeshi," Ministry of Foreign Affairs of Japan, December 3, 2024, https://www.mofa.go.jp/press/kaiken/kaikenite_000001_00034.html.

²³⁰ "S. Korea, US to Complete Strengthened 'Extended Deterrence' Regime in 1st Half of 2024: Yoon," *The Korea Times*, January 1, 2024, https://www.koreatimes.co.kr/www/nation/2024/11/113_366103. html.

²³¹ U.S. DOD, "Joint Press Statement of the 3rd Nuclear Consultative Group (NCG) Meeting," June 10, 2024, https://www.defense.gov/News/Release/Release/Article/3801107/joint-press-statement-on-the-3rd-nuclear-consultative-group-ncg-meeting/.

²³² Hyonhee Shin, "South Korea, US Work on Joint Strategy over North Nuclear Threat," *Reuters*, June 10, 2024, https://www.reuters.com/world/south-korea-us-hold-new-round-nuclear-planning-talks-seoul-2024-06-10/.

Ministry, U.S. B-52H strategic bombers and F-16 fighters, South Korean F-15 fighters and Japanese F-2 fighters participated in the drill.²³³

Criticisms and counterarguments

Various criticisms and objections to extended nuclear deterrence were made at the NPT PrepCom and other forums.

The NAM countries stated that "the Group expresses concern that all NWS, as well as some NNWS, to the extent that the latter subscribe to extended nuclear security guarantees and nuclear weapons sharing arrangements provided by the NWS, have increased the salience of nuclear weapons in their security and nuclear doctrines, policies and postures. In this context, the Group underscores that the policies of extended nuclear deterrence and "nuclear weapons sharing" run counter to the spirit and objectives of the Treaty and threaten its credibility and effectiveness."234 South Africa expressed its "regrets that in spite of strong criticism by the international community, the doctrine of nuclear deterrence continues to hold sway in the strategic thinking of nuclear weapons States, and gaining prominence in an increasing number of non-nuclear-weapon States that are under extended nuclear security guarantees."235 Brazil and Iran, among others, criticized

NATO's nuclear sharing as a violation of the NPT. China criticized the developments regarding the U.S. extended deterrence and its allies, stating the following:

China called on the relevant nuclearweapon States and non-nuclear-weapon States to reduce the role of nuclear weapons in national and collective security policies. We urge the United States to abandon the 'nuclear sharing' and 'extended deterrence' arrangements, withdraw all nuclear weapons deployed overseas, refrain from the development and deployment of global missile defense systems, immediately cease deploying land-based intermediate-range missiles in the Asia-Pacific."²³⁶

The relevant nuclear-weapon State should abandon the arrangement of nuclear sharing and extended deterrence, and withdraw all nuclear weapons deployed abroad back to its own territories. Before achieving this goal, the relevant nuclear-weapon States and nonnuclear-weapon States should be transparent about the arrangements above, and clarify whether they have breached Article 1 and 2 of the NPT. Meanwhile, in the context of concluding the international legal instrument on security assurances, the international

²³³ Shreyas Reddy, "US, ROK and Japan Hold Nuclear Bomber Drills After North Korean Missile Launch," *NK News*, April 2, 2024, https://www.nknews.org/2024/04/us-rok-and-japan-hold-nuclear-bomber-drills-after-north-korean-missile-launch/.

²³⁴ "Statement by the NAM countries," Consideration of the draft report on the results of the Preparatory Committee, Second PrepCom for the 11th NPT RevCon, August 2, 2024.

²³⁵ "Statement by South Africa," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

²³⁶ "Statement by China," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.

community should have in-depth discussions on the rights and obligations of non-nuclear-weapon States participating in the arrangements of nuclear sharing and extended deterrence.²³⁷

North Korea criticized the nuclear deterrence regime in the Indo-Pacific region in the First Committee of the UNGA as follows:²³⁸

Last year, the United States framed up a "nuclear consultative group" whose mission is to jointly plan, operate and execute nuclear attack against the DPRK, and in July this year signed the nuclear war program with the ROK titled "Guidelines for Nuclear Deterrence and Nuclear Operations on the Korean Peninsula" and adopted "Memorandum of Cooperation on the U.S.-Japan-ROK Trilateral Security Cooperation Framework." What cannot be overlooked is the fact that the nuclear strategic assets of the United States have been assigned with operational task on the Korean peninsula even in peacetime, rather than in emergency, and the U.S.-ROK military alliance has been elevated to a fullfledged "nuclear war alliance" that is completely distinctive from the past.

Against this backdrop, the United States is staging intensive nuclear war simulation drills against the DPRK this year such as trilateral multi-domain joint military exercise "Freedom Edge" involving Japan and the ROK on the Korean peninsula for the first time in history. Russia also stated the following regarding U.S. extended nuclear deterrence in Europe and Asia:

Particular emphasis should be put on the destabilizing practice of the NATO's socalled "nuclear sharing" involving forward-based U.S. nuclear weapons deployed in Europe, that is, thousands miles away from the United States, and capable of promptly hitting critical targets in the territory of Russia and its allies. Given the general increase in threats posed by the West and active modernization of the mentioned nuclear capabilities, this practice increases strategic risks and prompts one to take compensating counter-measures. This factor has considerably complicated the dialogue at the NPT forum for decades, and has long been a major obstacle to further steps in the field of nuclear disarmament. We reiterate that the United States' nuclear weapons must be completely withdrawn to their national territory and the relevant infrastructure in Europe must be dismantled.

Washington's steps to replicate such schemes in other parts of the world where the United States already practices its so-called "extended nuclear deterrence," also have extremely negative implications for regional and global security. In particular, the United States' and Republic of Korea's joint "nuclear planning" activities accompanied by calls to involve Japan in the process, create considerable tension in the Asia-Pacific and spur arms race. These tensions are

²³⁷ NPT/CONF.2026/PC.II/WP.34.

²³⁸ "Statement by North Korea," Thematic Debate on Nuclear Weapons, First Committee, UNGA, October 16, 2024.

fuelled by Washington's active steps to deploy its strategic platforms in the region, including nuclear delivery vehicles, and plans to transfer systems that could carry nuclear weapons, to their allies. In particular, the United States intends to transfer to Australia submarines designed, among other things, to carry nuclear cruise missiles that are under development. This poses a number of serious questions in the context of both the NPT and the Treaty of Rarotonga.²³⁹

In response to the above criticisms, Germany argued: "It is not NATO's nuclear sharing arrangements that are the cause of the current lack of progress in nuclear disarmament. NATO's nuclear sharing arrangements have been and continue to be fully consistent with the NPT, and were put into place well before the NPT entered into force in 1970. NPT negotiations accounted for NATO's nuclear posture, which resulted in a seamless integration into the NPT. This has long been accepted and publicly understood by all States Party to the NPT, including by Russia until 2015. Nuclear sharing has been in place during times of major progress in nuclear disarmament after the end of the Cold War."²⁴⁰ The Baltic states have expressed criticism regarding Russia's deployment of nuclear weapons in Belarus: "the attempts by Russia and Belarus to compare their

deployment of nuclear weapons with NATO's nuclear sharing are completely misleading. The fundamental purpose of NATO's nuclear capability is to preserve peace, prevent coercion and deter aggression. NATO's nuclear arrangements pre-existed the entry into force of the NPT and thus have been agreed to by all NPT States Parties. They continue to be fully consistent and compliant with the NPT. NATO Allies act with full respect of their international commitments."241 The EU stated: "We are deeply concerned by Russia's announced deployment of nuclear weapons on Belarussian territory. We recall the commitment Belarus made in the Budapest Memorandum 'to eliminate all nuclear weapons from [its] territory'. We therefore urgently call on Russia and Belarus to reverse this decision and to abide by all their aforementioned commitments."242

F) Risk reduction

In recent years, as nuclear disarmament efforts continue to stall and even regress, alongside growing concerns about the increased possibility of nuclear weapon use, there has been a heightened interest in nuclear risk reduction. This approach is seen as one of the few viable and concrete measures that could be collectively agreed upon to both advance nuclear disarmament and address these growing concerns. NNWS encompass a broad

²³⁹ "Statement by Russia," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 25, 2024.

²⁴⁰ "Statement by Germany," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.
²⁴¹ "Statement by Estonia, Latvia and Lithuania," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

²⁴² "Statement by the European Union," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 24, 2024.

perspective on nuclear risk reduction, which includes not only the prevention of unintended use of nuclear weapons but also the prevention of their intentional use. They propose a wide array of measures for nuclear arms control and disarmament, such as reducing nuclear arsenals and improving transparency. In contrast, NWS have predominantly focused their discussions on nuclear risk reduction with an emphasis on the prevention of the unintended use of nuclear weapons. The Hiroshima Report conducts an analysis and evaluation of nuclear risk reduction with a primary focus on the prevention of unintended nuclear weapon use, while taking up the arguments and proposals of both sides.

Efforts by NWS

At the NPT PrepCom in 2024, China stated that in order to "[s]trengthen cooperation in a rational and pragmatic manner to reduce strategic risks, Nuclearweapon States should make further efforts to reduce strategic risks on the basis of the Joint Statements of Leaders of the Five Nuclear-weapon States on Preventing Nuclear War and Avoiding Nuclear Arms Races issued in 2022. China hereby proposes that the five nuclear-weapon States negotiate and conclude a treaty on "mutual no-first-use of nuclear weapons" or issue a political statement in this regard and has put forward the elements of the treaty or political statement."²⁴³ China proposed that the five nuclear weapons states negotiate and conclude a treaty on the 'mutual non-use of nuclear weapons' or issue a political statement.

A senior U.S. official said that he held talks in November 2023 with the Chinese side on arms control and nuclear proliferation for the first time in about five years. However, he said that the Chinese side refused to hold subsequent talks and did not provide a substantive response to the U.S. risk reduction proposals.²⁴⁴ The United States added that China "has declined to schedule a followon meeting."²⁴⁵ In July 2024, China suspended its arms control dialogue with the United States because of continued U.S. arms sales to Taiwan.²⁴⁶

In the meantime, U.S. and Chinese defense officials held high-level Defense Policy Coordination Talks (DPCT) at the U.S. Department of Defense on January 8-9, 2024. Held for the first time since September 2021, these talks were intended to facilitate communication to avoid accidental military conflicts between the United States and China in the Taiwan

²⁴³ "Statement by China," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.

²⁴⁴ "US Questions China's No-First-Use Nuclear Call Given Buildup," *Reuters,* May 16, 2024, https://www.reuters.com/world/us-questions-chinas-no-first-use-nuclear-call-given-buildup-2024-05-15/.

²⁴⁵ Xiaodon Liang and Shizuka Kuramitsu, "China Silent on U.S. Risk Reduction Proposals," *Arms Control Association*, June 2024, https://www.armscontrol.org/act/2024-06/news/china-silent-us-risk-reduction-proposals.

²⁴⁶ Unshin Lee Harpley, "China Halts Nuclear Arms Control Talks with US: Why and What's Next," *Air & Space Forces Magazine*, July 19, 2024, https://www.airandspaceforces.com/china-halts-nuclear-arms-control-talks-us/.

Strait and the East and South China Seas.²⁴⁷ In April, the United States and China held working-level talks (the first since 2021) under the Military Maritime Consultative Agreement (MMCA). In a statement, the U.S. military reported that officials from both countries "reviewed security-related events over the past several years and discussed maintaining operational safety and professionalism at sea and in the air."248 China also revealed that it had notified the countries concerned in advance when it conducted an ICBM launch test on September 25.249 The United States acknowledged this but added that "[t]he Department of Defense will seek to further establish a mechanism for bilateral notification of the launch of ballistic missiles and other missiles."250 In March, experts and former government officials from the United States and China resumed semi-official nuclear arms talks for the first time in five years.²⁵¹

Russia said: "What we need is urgent steps to extinguish the existing conflicts, and systemic measures to prevent the new hotbeds of confrontation from escalation. Emphasis should be made on tackling the root causes of fundamental controversies relying on the principles of equality, indivisible security and mutual respect of each other's core interests. Practical adherence to these principles is especially important for minimizing strategic risks in relations of nuclear powers on a comprehensive and lasting basis. Without this, no nuclear threat reduction model can be viable."²⁵² Russia also stated the following:

One should also mention Washington's long-term policy of shaking and reformatting the arms control architecture to suit its selfish purposes. The system of relevant mutually reinforcing agreements has already been largely destroyed by the United States, who, on the one hand, has cynically dismantled all the international instruments that restrained it, and, on the other hand, took destructive steps that rendered the implementation of a number of treaties counter-productive for other parties. All this highlights the hypocrisy of the United States' attempts to impose on its opponents unfair arms control and strategic risk reduction schemes that do not correspond to the

²⁴⁷ Haley Britzky, "US and Chinese Officials Met This Week at the Pentagon to Discuss Relations," *CNN*, January 10, 2024, https://edition.cnn.com/2024/01/09/politics/us-chinese-officials-meet-pentagon/index.html.

²⁴⁸ "US, China Hold Military Talks in Hawaii," *Reuters*, April 6, 2024, https://www.reuters. com/world/us-china-hold-military-talks-hawaii-2024-04-05/.

²⁴⁹ Laurie Chen and Ben Blanchard, "China's PLA Conducts Rare Publicized Test Launch of Intercontinental Ballistic Missile," *Reuters*, September 26, 2024, https://www.reuters.com/world/china/chinas-pla-launches-intercontinental-ballistic-missile-into-pacific-ocean-2024-09-25/.

²⁵⁰ U.S. DOD, "Deputy Pentagon Press Secretary Sabrina Singh Holds a News Briefing," September 25, 2024, https://www.defense.gov/News/Transcripts/Transcript/Article/3917835/deputy-pentagon-press -secretary-sabrina-singh-holds-a-news-briefing/.

²⁵¹ Bill Gertz, "White House says Beijing Rejects Call to Restrict AI Use in Nuclear Weapons Use," *The Washington Times,* June 24, 2024, https://www.washingtontimes.com/news/2024/jun/24/white-house-says-beijing-rejects-call-to-restrict-/.

²⁵² "Statement by Russia," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.

realities and benefit no one but Washington. Until Washington and the U.S.-led NATO, who renounce the principle of equality and show no readiness to respect our security interests, abandon their profoundly hostile anti-Russian policy, strategic dialogue with the West remains pointless to Russia. While the conditions for such dialogue are missing, Russia continues to take a number of relevant measures to reduce nuclear danger and maintain acceptable level of predictability and stability in the nuclear and missile sphere. Those include voluntary observance of quantitative restrictions on strategic offensive arms stipulated in the suspended New START Treaty, throughout its duration.²⁵³

On October 8, Russia stated that an emergency hotline with the United States and NATO was maintained.²⁵⁴ However, on November 20, Russian spokesperson Dmitri Peskov said that the hotline was no longer being used.²⁵⁵ However, Russia stated that the United States had received prior notification of the launch of the Oreshnik IRBM against Ukraine on November 21 through the U.S.-Russia ballistic missile launch notification system. Since January 2022, the five NWS have not issued a joint statement on nuclear issues, including risk reduction. However, although meetings were temporarily suspended after Russia's full-scale invasion of Ukraine in February 2022, a working group chaired by Russia was held in Saudi Arabia in February 2024.²⁵⁶ An expert meeting was also held in Dubai in December.²⁵⁷

At the 2024 NPT PrepCom, the United States highlighted the challenges of maintaining nuclear restraint, emphasizing the lack of dialogue on arms control and the importance of risk-reduction measures through cooperation with Russia and China. "We proposed risk reduction steps to the P5, such as establishing crisis communication channels among the five nuclear-weapon states, formalizing ballistic missile launch notifications, and committing to maintain a 'human-in-theloop' for the command, control, and employment of nuclear weapons. We regret that two of these states have yet to engage substantively on this agenda."²⁵⁸

Prior to this statement, U.S. Department of State Bureau of arms control official

²⁵³ "Statement by Russia," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 25, 2024.

²⁵⁴ Guy Faulconbridge and Lidia Kelly, "Russia Says Emergency Hotlines with US and NATO Remain as Nuclear Risks Rise," *Reuters*, October 8, 2024, https://www.reuters.com/world/europe/russia-says-emergency-hotlines-with-us-nato-remain-nuclear-risks-rise-2024-10-08/.

²⁵⁵ Lidia Kelly, "Kremlin Says Russia-US Hotline to Deflate Crisis Not in Use," *Reuters*, November 20, 2024, https://www.reuters.com/world/kremlin-says-russia-us-hotline-deflate-crisis-not-use-2024-11-20/.

²⁵⁶ "Working Meeting of Five Nuclear Powers Held in Saudi Arabia on February 29," *TASS*, March 5, 2024, https://tass.com/politics/1755335.

²⁵⁷ "FM Spokesperson: China Supports Discussions of 5 Nuclear-Weapon States Mechanism," The State Council Information Office of The People's Republic of China, December 26, 2024, http://english.sci o.gov.cn/pressroom/2024-12/11/content_117600140.html.

²⁵⁸ "Statement by the United States," General Debate, Second PrepCom for the 11th NPT RevCon, July 22, 2024.

Paul Dean said that the United States, France and the United Kingdom had made a "clear and strong commitment" that they would not delegate decisionmaking on the use of nuclear weapons to artificial intelligence (AI).²⁵⁹ On May 14, the U.S. and China held their first bilateral dialogue on AI in Geneva, where they discussed the need for regulation and risk management.²⁶⁰ Moreover, the leaders of both countries met on November 16. The US readout of the meeting stated the following: "Building on a candid and constructive dialogue on AI and cosponsorship of each other's resolutions on AI at the UN General Assembly, the two leaders affirmed the need to address the risks of AI systems, improve AI safety and international cooperation, and promote AI for good for all. The two leaders affirmed the need to maintain human control over the decision to use nuclear weapons. The two leaders also stressed the need to consider carefully the potential risks and develop AI technology in the military field in a prudent and responsible manner."261

On April 25, Russia vetoed and China abstained on a draft UN Security Council resolution jointly submitted by the United States and Japan, which called for a ban on the deployment of nuclear weapons in outer space. Japan and the United States submitted a draft resolution, titled "Weapons of mass destruction in outer space," which requires to "[affirm] the obligation of all States parties to fully comply with the Outer Space Treaty," and urges "not to develop nuclear weapons or any other kinds of weapons of mass destruction specifically designed to be placed in orbit around the Earth, to be installed on celestial bodies, or to be stationed in outer space in any other manner." The resolution was adopted with the following voting behavior:²⁶² 167 in favor (Australia, Austria, Brazil, Canada, Egypt, France, Germany, India, Indonesia, Israel, Japan, Kazakhstan, South Korea, Mexico, Netherlands, New Zealand, Norway, Pakistan, Poland, Saudi Arabia, South Africa, Sweden, Turkey, United Kingdom, United States and others); 4 against (Iran, North Korea, Russia and Syria); 6 abstentions (China and others).

Proposals by NNWS

At the NPT PrepCom in 2024, NNWS made various proposals on nuclear risk reduction.

The Stockholm Initiative (comprising 14 countries including Canada, Germany,

²⁵⁹ Greg Torode, "US Officials Urges China, Russia to Declare Only Humans, Not AI, Control Nuclear Weapons," *Reuters,* May 2, 2024, https://www.reuters.com/world/us-official-urges-china-russia-declare-only-humans-not-ai-control-nuclear-2024-05-02/.

²⁶⁰ Jamey Keaten and Kelvin Chan, "In First AI Dialogue, US Cites 'Misuse' of AI by China, Beijing Protests Washington's Restrictions," *AP*, May 16, 2024, https://apnews.com/article/artificial-intelligencechina-united-states-biden-xi-geneva-506da7b5fa72d5fe1bcd54fb8ec4f898.

²⁶¹ "Readout of President Joe Biden's Meeting with President Xi Jinping of the People's Republic of China," U.S. Embassy & Consulates in China, November 17, 2024, https://china.usembassy-china.org.cn/readout-of-president-joe-bidens-meeting-with-president-xi-jinping-of-the-peoples-republic-of-china-3/.

²⁶² A/RES/79/18, December 2, 2024.

Indonesia, Japan, Kazakhstan, South Korea, the Netherlands, New Zealand, Norway, Sweden, and Switzerland), which has been actively making proposals on this issue in recent years, referred to measures to reduce nuclear risks in a broad sense in a working document submitted to the 2024 NPT Preparatory Committee.²⁶³

In its working document, the NAC asserted that nuclear risk reduction does not justify the possession of nuclear weapons. It regards it merely as a temporary measure until the abolition of nuclear weapons, and it cannot be an alternative to nuclear disarmament:²⁶⁴

"We strongly reject attempts to create a distinction between so-called "responsible" and "irresponsible" nuclear weapons possession or behaviour. Nuclear deterrence always rests upon the threat of use of nuclear weapons. The only responsible option is to reduce reliance on nuclear weapons and achieve their total and complete elimination without delay.

Faced with grave nuclear dangers, there is an urgent need for concrete measures to lower the risk of nuclear weapons use and contribute to the prevention of nuclear war. All States that rely on nuclear weapons for their security should take immediate action in this vein. With a view to total elimination of nuclear weapons, States need to reduce the role of nuclear weapons in their security doctrines, policies and plans without prejudice to the need to immediately accelerate the implementation of all relevant nuclear disarmament obligations and commitments.

Measures to reduce the risk of nuclear weapons use with a view to creating greater stability will not in themselves eliminate that underlying risk. Such an approach is not credible and simply cannot work in perpetuity. Completely removing the risks associated with nuclear weapons requires their total, irreversible and verifiable elimination.

Iran argued: "NATO's nuclear-weapon states, with western allies' assistance, are shifting the NPT review focus from disarmament to risk reduction, maintaining the status quo and the new nuclear arms race."265 South Africa "views nuclear risk reduction considerations as having a role in nuclear disarmament, but this should not be considered as a replacement for effective nuclear disarmament measures, in accordance with Article VI, nor should it serve to promote the indefinite possession of nuclear arsenals or obscure the catastrophic nature of these weapons. The only way to completely remove the risks associated with nuclear weapons is their total, irreversible and verifiable elimination, and the legally binding assurance that they will never be produced again."266

²⁶³ NPT/CONF.2026/PC.II/WP.13, May 28, 2024.

²⁶⁴ NPT/CONF.2026/PC.II/WP.2, May 16, 2024.

²⁶⁵ "Statement by Iran," Cluster 1, First PrepCom for the 11th NPT RevCon, July 25, 2024.

²⁶⁶ "Statement by South Africa," Cluster 1, First PrepCom for the 11th NPT RevCon, July 24, 2024.
(7) De-alerting or Measures for Maximizing Decision Time to Authorize the Use of Nuclear Weapons

In 2024, there were no significant changes in NWS and nuclear-armed states' official policies on alert and/or operational status of their respective nuclear forces. Russian and U.S. strategic ballistic missiles have been on high alert status. In its 2022 Nuclear Posture Review, the United States indicated that while its ICBMs are not on "hair trigger" alert, it would not reduce its alert level, as it could undermine crisis stability.²⁶⁷ As for the United Kingdom and France, their respective nuclear forces are kept on alert with their continuous SSBN patrols, albeit at lower readiness levels than those of the two nuclear superpowers.

China has not been expected to be on high alert in peacetime like the United States and Russia, but what China really means by "moderate readiness"²⁶⁸ remains unclear. The United States has recently highlighted the possibility of changes in these policies towards a launch-onwarning (LOW) posture, considering China's introduction of MIRVed ICBMs and new SSBNs/SLBMs, as well as its development of an early warning system in cooperation with Russia.²⁶⁹ In response to these U.S. assertions, China has repeatedly stated that its nuclear posture, including its alert status, has not changed.

Little definitive information has been made available regarding the alert status of other nuclear-armed states' nuclear forces. It is widely considered that India's nuclear forces are not on a high alert status. North Korea was reported to have introduced a new policy at the meeting of the Central Military Commission of the Workers' Party of Korea in May 2020, aiming to place its "strategic military forces under a heightened state of alert".²⁷⁰ Furthermore, in the "Nuclear Use Regulations" announced by North Korea in October 2022, it is also stated that "in the event that the command and control system of the national nuclear force is in danger due to an attack by hostile forces, a nuclear strike to annihilate the hostile forces, starting with the starting point and command center, will be carried out automatically and immediately in accordance with the predetermined operational plan."271

Proponents of de-alerting have often argued that such measures are useful in preventing accidental use of nuclear weapons. The UNGA resolution titled

²⁶⁷ The U.S. Department of Defense (DOD), 2022 Nuclear Posture Review, 2022, p. 13.

²⁶⁸ NPT/CONF.2020/41, November 16, 2021.

²⁶⁹ U.S. DOD, *Military and Security Developments Involving the People's Republic of China 2023*, October 2023, p. 112.

²⁷⁰ "Supreme Leader Kim Jong Un Guides Enlarged Meeting of WPK Central Military Commission," *KCNA*, May 24, 2020, http://www.kcna.co.jp/item/2020/202005/news24/20200524-01ee.html.

²⁷¹ "Law on DPRK's Policy on Nuclear Forces Promulgated," KCNA Watch, September 9, 2022, https://kcnawatch.org/newstream/1662687258-950776986/law-on-dprks-policy-on-nuclear-forces-pro mulgated/.

"Reducing nuclear danger"²⁷² called for "immediate and urgent steps to reduce the risks of unintentional and accidental use of nuclear weapons." It was adopted by 124 countries. However, 49 countries (including Australia, Austria, Canada, France, Germany, Israel, South Korea, the Netherlands, New Zealand, Norway, Poland, Sweden, Switzerland, Turkey, the United Kingdom and the United States) voted against it, and 11 countries (including China, Japan, North Korea, Pakistan and Russia) abstained.

(8) Comprehensive Nuclear-Test-Ban Treaty (CTBT)

A) Signing and ratifying the CTBT

As of the end of 2024, 178 of the 187 signatories have deposited their instruments of ratification of the Comprehensive Nuclear-Test-Ban Treaty (CTBT).

Papua New Guinea has become the 178th State to ratify the CTBT.²⁷³ Among the 44 states listed in Annex 2 of the CTBT, whose ratification is a prerequisite for the treaty's entry into force, six states (China, Egypt, Iran, Israel, Russia and the United States) have signed but not ratified, and three (India, North Korea and Pakistan) have not signed. Among the countries surveyed, Saudi Arabia and Syria have also

yet to sign the CTBT.

In its address at the 2024 NPT PrepCom, Russia presented its withdrawal of ratification of the CTBT in 2023 as "a natural response to the disparity in obligations with the United States," while also stating that it "continues to take full part in the CTBT process and have recently completed our segment of the International Monitoring System, the largest certified segment to date. We stand ready to return to the issue of the CTBT ratification as soon as the United States ratifies it."²⁷⁴

At the 2023 UNGA, a resolution titled "Comprehensive Nuclear-Test-Ban Treaty",²⁷⁵ in which member states emphasized the vital importance and urgency of signing and ratifying the treaty without delay and without conditions to achieve its earliest entry into force, was adopted with 181 countries in favor, none against, and four abstentions (India, Saudi Arabia, Syria and others). North Korea did not vote.

On September 25, the 11th Meeting of Foreign Ministers of the Friends of the CTBT was held at the UN Headquarters. The meeting was attended by about 50 countries, including the CTBT Friends Member States (Japan, Australia, the Netherlands, Germany, Canada, and Finland) and Norway, as the Joint

²⁷⁴ "Statement by Russia," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.

²⁷² A/RES/79/33, December 2, 2024.

²⁷³ "Papua New Guinea Ratifies CTBT, Advancing Treaty Universalisation in Pacific," CTBTO, March 13, 2024, https://www.ctbto.org/news-and-events/news/papua-new-guinea-ratifies-ctbt-advancing-treaty-universalisation-pacific#:~:text=.

²⁷⁵ A/RES/79/77, December 2, 2024.

Coordinating Party for Facilitating the Entry into Force of the CTBT. A Joint Ministerial Statement was adopted, calling for the early ratification of the treaty by all non-signatories and non-ratifying countries, especially those which have yet to ratify the treaty.²⁷⁶

On August 29, a meeting was held at the UN to commemorate the International Day against Nuclear Testing, which was established under the leadership of Kazakhstan.²⁷⁷

Regarding outreach activities for promoting the treaty's entry into force, a document, titled "Activities Undertaken by Signatory and Ratifying States Under Measure (K) of the Final Declaration of the 2015 Article XIV Conference in the Period June 2022-May 2023," was distributed at the Article XIV Conference on Facilitating the Entry-Into-Force of the CTBT, and summarized activities conducted by ratifying and signatory states. It highlighted:²⁷⁸

- Bilateral activities related to Annex 2 states (conducted by Australia, Japan, New Zealand, Russia, Switzerland, the United Kingdom, the United States and others);
- Bilateral activities related to non-Annex
 2 states (conducted by Australia, Japan,

New Zealand, Russia, the United Kingdom, the United States and others);

- Global-level activities (conducted by Australia, Japan, South Korea, Mexico, New Zealand, Russia, Switzerland, the United Kingdom, the United States and others); and
- Regional-level activities (conducted by Australia, Mexico, New Zealand, Russia, the United States and others).

B) Moratoria on nuclear test explosions pending the CTBT's entry into force

The five NWS plus India and Pakistan continued to maintain a moratorium on nuclear test explosions. However, in its 2024 annual report on Adherence to and Compliance with Arms Control, Non-Proliferation and disarmament agreements and commitments,²⁷⁹ the United States has shared concerns over the lack of transparency regarding China and Russia's nuclear testing activities, as well as their adherence to the moratoria.

Since the withdrawal of its ratification of the CTBT in 2023, Russia has repeatedly stated that it will not conduct nuclear tests unless the United States does so. In June 2024, President Putin stated that Russia may conduct nuclear tests "if necessary,"

²⁷⁶ "2024 Joint Ministerial Statement on the Comprehensive Nuclear-Test-Ban Treaty," Eleventh Ministerial Meeting of the Friends of the CTBT, September 24, 2024, https://www.mofa.go.j p/mofaj/files/100729819.pdf.

²⁷⁷ Monica Grayley, "Press Briefing," UN General Assembly, August 26, 2024, https://www.un.org /pga/78/2024/08/26/spokespersons-briefing-26-august-2024/.

²⁷⁸ CTBT-Art.XIV/2023/4, August 28, 2023.

²⁷⁹ The U.S. Department of State, Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments, April 2024, p.19, https://www.state.gov/wp-content/upload s/2024/04/2024-Arms-Control-Treaty-Compliance-Report.pdf.

but that there was no need to do so at the present time.²⁸⁰

In the 2022 NPR, the United States stated that it had refrained from conducting nuclear tests since 1992 and denied the need for such testing. However, it also noted that if any issues arose related to the extended lifespan of nuclear warheads, the production infrastructure's ability to implement the necessary changes could hinder planned modernization programs. The United States has therefore maintained a nuclear testing preparedness program, should it become necessary to resolve technical uncertainties.²⁸¹

Israel, whose nuclear policy remains opaque, has not disclosed any intention to conduct nuclear tests. Regarding North Korea, after Kim Jon-un reconsidered the moratorium on long-range ballistic missile launch tests and nuclear explosion tests in January 2022 and instructed relevant departments to quickly consider resuming them,²⁸² there were frequent reports that preparations for nuclear tests had been completed. However, as of the end of 2024, North Korea has not resumed nuclear explosion tests. study, the status of their contribution payments to the CTBTO as of December 31, 2024, is as follows:²⁸³

- Fully paid (106 countries): Australia, Austria, Brazil, Canada, China, Egypt, France, Germany, Indonesia, Israel, Kazakhstan, South Korea, the Netherlands, New Zealand, Norway, Poland, South Africa, Sweden, Switzerland, Turkey, the United Kingdom and the United States.
- Partially paid (19 countries): Japan, Mexico and Russia.
- Voting right in the Preparatory Commission suspended because arrears are equal to or larger than its contributions due for the last two years: Iran

D) Contribution to the development of the CTBT verification systems

The establishment of the CTBT verification system has made steady progress. In December 2023, Russia established the last domestic station on Sakhalin Island in eastern Russia, out of the 32 facilities that Russia was required to establish under the International

C) Cooperation with the CTBTO Preparatory Commission

Regarding the countries surveyed in this

²⁸⁰ Andrew Osborn, "Russian Nuclear Test Chief Says Moscow Is Ready to Resume Testing 'At Any Moment," *Reuters,* September 17, 2024, https://www.reuters.com/world/europe/russian-nuclear-test-chief-says-moscow-is-ready-resume-testing-at-any-moment-2024-09-17/.

²⁸¹ US, 2022 NPR, p. 22.

²⁸² Colin Zwirko, "North Korea Hints at 'Resuming' Long-Range Weapons Tests After New US Sanctions," NK News, January 20, 2022, https://www.nknews.org/2022/01/north-korea-hints-at-resuming-longrange-weapons-tests-after-new-us-sanctions/.

²⁸³ CTBTO, "Status of Assessed Contributions," December 31, 2024, https://www.ctbto.org/ sites/default/files/2025-01/52_Weekly%20AC%20Status%2031%20Dec%202024_web.pdf.

Monitoring System (IMS).²⁸⁴ However, the establishment of IMS stations in Egypt and Iran—along with those in India, North Korea, Pakistan and Saudi Arabia, which have yet to sign the CTBT—has been slower compared other signatory countries. In addition, nearly half of China's stations remain to be certified by the CTBTO Preparatory Committee.²⁸⁵

The EU submitted a working paper on the CTBT at the 2024 NPT Review Conference and proposed the following recommendations regarding the role of the verification system during the 2026 review cycle:²⁸⁶

In the 2026 review cycle, States parties should:

(a) Acknowledge the progress made to establish the CTBT verification regime, as evidenced by the work of the [IMS] and the International Data Centre [(IDC)] and by the experience gained with on-site inspections;

(b) Support the completion of the [IMS] and its sustainment, including through the adequate and predictable provision of funding;

(c) Call upon all States that host [IMS] facilities to transmit without restriction data to the [IDC] and to consider concluding and putting into force a facility agreement, subject to internal regulations; [... and]

(k) Call upon all States signatories to the [CTBT] to honour the legal obligation of their assessed contributions and encourage States to provide voluntary contributions of a financial or in-kind nature to the Organization.

On October 5, an earthquake was detected in Semnan Province in northern Iran, raising suspicions that it might have been a nuclear test. However, after analyzing the information collected by the CTBTO's IMS and IDC in Vienna, it was concluded that the event exhibited characteristics consistent with other earthquakes that have occurred in the same region.²⁸⁷

E) Nuclear testing

No country conducted a nuclear test explosion in 2024. In its 2023 report on compliance with arms control, nonproliferation and disarmament agreements, the United States suggested that China and Russia might have conducted nuclear tests that produced a yield, contrary to the common understanding that the CTBT's standard is "zero yield".²⁸⁸ However, in its 2024 report, the United States did not mention the CTBT or the possibility of nuclear

²⁸⁴ "Russia's Last Global Monitoring System Station Is Installed, Sending Data," CTBTO, December 14, 2023, https://www.ctbto.org/news-and-events/news/russias-last-global-monitoring-system-station-insta lled-sending-data.

²⁸⁵ CTBTO, "Station Profiles," https://www.ctbto.org/verification-regime/station-profiles/.

²⁸⁶ NPT/CONF.2026/PC.II/WP.1, April 23, 2024.

²⁸⁷ "CTBTO Detects Two Earthquakes in Northen Iran on 5 October," CTBTO, October 9, 2024, http s://www.ctbto.org/news-and-events/news/ctbto-detects-two-earthquakes-northern-iran-5-october.

²⁸⁸ The U.S. Department of State, "Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments," April 2023.

tests by China and Russia.²⁸⁹ Both China and Russia have denied these suspicions, saying that they have not conducted any tests in violation of the treaty.

As mentioned above, in September 2024, the head of the facility at the Novaya Zemlya nuclear test site said in an interview, "The test site is ready to resume full-scale testing activities. Everything is ready. The labs and experimental facilities are ready. The personnel are ready. If we get the order, we can start the experiments at any time."²⁹⁰ In April, increasing activity at the Novaya Zemlya nuclear test site was reported, with the largest above-ground facility nearing completion.²⁹¹ Prior to this, in January, researchers at the Russian Army Logistics Academy developed and manufactured a simulator that mimics a ground-based nuclear explosion to better train Moscow's Ground Forces for combat operations involving atomic weapons. This device is said to provide "a clear simulation of the visual featuresthe impact effect, light flash and mushroom-shaped dust cloud of a

ground-based nuclear explosion."292

Russia has occasionally hinted at the possibility of resuming nuclear testing amid the ongoing war in Ukraine. In November 2024, Deputy Foreign Minister Ryabkov said that the possibility of resuming nuclear weapons tests remained an open question, citing allegedly hostile U.S. policies as a key factor: "This is a question at hand", he told TASS news agency when asked whether Moscow was considering a resumption of tests. "And without anticipating anything, let me simply say that the situation is quite difficult. It is constantly being considered in all its components and in all its aspects."293

In April 2024, the U.S. think tank CSIS analyzed satellite imagery revealing that North Korea had kept the Punggye-ri nuclear test site in a ready-to-use condition, as South Korea and the United States assessed that "North Korea has completed all preparations for its seventh nuclear test."²⁹⁴ In addition, Lee Seongkweun, a member of South Korea's

²⁸⁹ The U.S. Department of State, "Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments," April 2024.

²⁹⁰ Andrew Osborn, "Russian Nuclear Test Chief Says Moscow Is Ready to Resume Testing 'At Any Moment," *Reuters,* September 17, 2024, https://www.reuters.com/world/europe/russian-nuclear-test-chief-says-moscow-is-ready-resume-testing-at-any-moment-2024-09-17/.

²⁹¹ "Increased Activity at Nuclear Test Site in Northern Russia: Expert," *Kyodo News*, April 8, 2024, https://english.kyodonews.net/news/2024/04/5b04075ff3c8-increased-activity-at-nuclear-test-site-in-northern-russia-expert.html.

²⁹² Kaitlin Lewis, "Russia Develops Nuclear Explosion Simulator," *Newsweek*, January 23, 2024, https://www.newsweek.com/russia-develops-nuclear-explosion-simulator-1863342.

²⁹³ Ron Popeski, "Senior Russian Diplomat Says Possibility of New Nuclear Tests Remains Open Question," *Reuters,* November 30, 2024, https://www.reuters.com/world/europe/senior-russian-diplomat-says-possibility-new-nuclear-tests-remains-open-question-2024-11-30/.

²⁹⁴ Joseph S. Bermudez Jr., Victor Cha and Jennifer Jun, "Recent Activity Observed at Punggye-ri Nuclear Test Facility," *Beyond Parallel*, April 10, 2024, https://beyondparallel.csis.org/recent-activity-observed-at-punggye-ri-nuclear-test-facility-2/.

National Assembly Intelligence Committee, said on September 26 that the committee believed there was a possibility that North Korea would conduct its seventh nuclear test after the U.S. presidential election.²⁹⁵ At the end of October, the Defense Intelligence Headquarters of the South Korean Ministry of National Defense revealed that North Korea appeared to have almost completed its internal preparations at its nuclear test site.²⁹⁶ However, as of the end of 2024, North Korea had not conducted a seventh nuclear explosion test.

Regarding experimental activities other than nuclear test explosions, the United States continues to conduct various nonexplosive tests and experiments under the Stockpile Stewardship Program (SSP), aiming to sustain and evaluate its nuclear weapons stockpile without the use of underground nuclear tests. These include subcritical tests and experiments using the Z machine, which generates X-rays by fast discharge of capacitors, thus allowing to explore the properties of plutonium under extreme pressures and temperatures.

The U.S. NNSA announced that it conducted a subcritical nuclear test on

May 14, 2024, with the aim of collecting data to maintain the safety, reliability, effectiveness, and performance of nuclear warheads. The NNSA said the subcritical experiment was the first in a series of experiments dubbed "Nimble" and that the series will continue. In addition, Marvin Adams, NNSA deputy director for defense programming, said that "we are planning to increase the frequency of subcritical tests to obtain important information about the materials used in nuclear weapons."297 The existence of previously undisclosed tests was revealed, as announced by the Japanese NGO Peace Depot on April 15. It was later confirmed that a test had been conducted in 2007.298

While France, Russia and the United Kingdom have engaged in subcritical experiments and other activities that do not lead to nuclear explosions, there have been no specific instances reported in 2024. The other nuclear armed-states have not released any information as to whether they have conducted nonexplosive testing activities.

In its March 2024 "Defence Nuclear Enterprise" command paper, the United Kingdom announced that it would

²⁹⁵ Hyunsu Yim, "North Korea May Be Able to Produce a Double-Digit Number of Nuclear Weapons, MP Says," *Reuters*, September 26, 2024, https://www.reuters.com/world/asia-pacific/north-korea-may-be-able-produce-double-digit-number-nuclear-weapons-mp-says-2024-09-26/.

²⁹⁶ "North Korea Finishes Preparations for Nuclear Test: South Korea," *Kyodo News*, October 30, 2024, https://english.kyodonews.net/news/2024/10/dde1313cf863-urgent-n-korea-finishes-preparations-for-nuclear-test-s-korea.html.

²⁹⁷ U.S. Department of Energy, "NNSA completes subcritical experiment at PULSE facility in Nevada," May 16, 2024, https://www.energy.gov/nnsa/articles/nnsa-completes-subcritical-experiment-pulse-facility-nevada.

²⁹⁸ "Criteria Shift Raises U.S. Subcritical Nuclear Test Count: Peace NPO", *Kyodo News*, April 21, 2024, https://english.kyodonews.net/news/2024/04/4d4f994ccb68-criteria-shift-raises-us-subcritical-nuclear-test-count-peace-npo.html.

develop new nuclear warheads without conducting nuclear explosion test, in addition to the development of "modeling and non-nuclear testing capabilities to maintain the safety and effectiveness of nuclear weapons without conducting nuclear explosion tests",²⁹⁹ citing the following examples:

- We have developed unique and world-leading technology to validate the United Kingdom's warhead stockpile. The Orion laser helps our physicists and scientists research the physics of those extreme temperatures and pressures found in a nuclear explosion to better understand the safety, reliability and performance of nuclear warheads. Orion is used collaboratively with U.K. academia and U.S. teams in their National Laboratories.
- Supercomputing is also a crucial capability, enabling simulations that allow us to develop a safe, assured warhead without detonation. Atomic Weapons Establishment (AWE) has recently commissioned a supercomputer named Valiant, one of the most powerful computers in the United Kingdom, to validate the design, performance and reliability of our nuclear warhead.³⁰⁰

In addition, this document provides an overview of the relationship with France as follows:

EPURE [(Experimentations de Physique Utilisant la Radiographie Éclair)] is a technologically-advanced hydrodynamic facility at Valduc, in France, near Dijon. Hydrodynamic testing uses radiography to measure the performance of materials at extreme temperature and pressure. While the United Kingdom and France maintain operational independence, the facility will be jointly managed, with both nations performing sophisticated experiments to inform their modelling of the performance and safety of the nuclear weapons without undertaking nuclear explosive tests. This makes an important contribution to assuring the performance of our next generation of nuclear weapons without nuclear weapon test explosions.301

While the CTBT does not prohibit any nuclear test unaccompanied by an explosion, the NAM countries argued:

[T]he Group expresses grave concern at the nuclear weapon test explosions in alternative ways, as well as the use of new technologies for upgrading the existing nuclear weapons systems as well as the development of new types of nuclear weapons, which may result in the resumption of tests and a lowering of the nuclear threshold. Accordingly, the Group strongly calls on the nuclearweapon States to put an immediate end to such activities and refrain from any other action that would defeat the object and purpose of the Comprehensive Nuclear-Test-Ban Treaty, pending its

²⁹⁹ Defence Nuclear Enterprise, "Delivering the UK's Nuclear Deterrent as a National Endeavour," March 2024, p. 33.

³⁰⁰ Ibid.

³⁰¹ Ibid.

entry into force.302

Contrasting with the CTBT, which explicitly prohibits any nuclear test "explosions," the TPNW broadly bans "nuclear tests," a term that could be interpreted to include even tests that do not result in an explosion. Meanwhile, the TPNW does not specify measures for verifying compliance with this testing ban.

(9) FMCT

A) Efforts toward commencing negotiations on an FMCT

In the "Decision 2: Principles and Objectives for Nuclear Non-Proliferation and Disarmament" adopted at the 1995 NPT Review and Extension Conference, participating countries agreed on the immediate commencement and early conclusion of negotiations on a Fissile Material Cut-off Treaty (FMCT) at the CD. However, substantive negotiations have yet to begin.

Pakistan has obstructed the adoption of the "2024 Program of Work" proposed by India during its presidency at the Conference of Disarmament (CD) in Geneva in 2024, despite the absence of any reference to the FMCT in India's proposal.³⁰³

At the UNGA First Committee in 2024,

Pakistan, as it had the previous year, opposed the formulation of a treaty that would only ban new production, stating the following:³⁰⁴

The States, which do not need to produce fissile material after having already amassed several tonnes of fissile material in excess, are pushing for costfree proposals such as quantitative capping of fissile material as "the next logical step." In these diversionary tactics, they are joined with fervour by the States, who rely on others for extended deterrence and nuclear weapon sharing arrangements.

On the issue of fissile material cut-off treaty (FMCT), we would like to reiterate that the time to pursue this flawed approach has long passed. It is time to update the talking points. A treaty which only results in a cut-off in the future production of fissile material without including existing stocks in its scope would be a non-starter given that it would perpetuate asymmetries and will have no added value for nuclear disarmament.

If the proponents of the FMCT are serious in addressing the issue of fissile material production, they should start by rejecting double standards and ceasing nuclear cooperation with a country in South Asia that continues to amass stockpiles outside safeguards and is now on the path of a major breakout in terms

³⁰² NPT/CONF.2026/PC.II/WP.23, June 26, 2024.

³⁰³ Nayan Dwivedi, "Pakistan Blocks India-Proposed '2024 Program of Work' at Conference of Disarmament in Geneva – All About It," *Swarajya*, February 17, 2024, https://swarajyamag.com/news-brief/pakistan-blocks-india-proposed-2024-program-of-work-at-conference-of-disarmament-in-geneva-all-about-it.

³⁰⁴ "Statement by Pakistan," Thematic Debate on Nuclear Weapons, First Committee, UNGA, October 21, 2024.

of fissile production. Short of that, their calls for moratorium or a cut-off treaty ring hollow.

With negotiations on an FMCT still to begin, Japan, serving as the President of the Security Council, announced the launch of the "FMCT Friends" on March 18 at the Security Council Ministerial Meeting on Nuclear Disarmament and Non-Proliferation. The aim of this initiative is to "contribute to maintaining and strengthening political interest in the FMCT and to expanding support for the commencement of negotiations on the FMCT." It is said that 12 countries will participate, including Australia, Brazil, Canada, France, Germany, Japan, the Netherlands, the United Kingdom and the United States.³⁰⁵

On September 23, Prime Minister Kishida held a high-level launch meeting for the FMCT Friends in New York.³⁰⁶ The following points were shared in the meeting's joint press release:³⁰⁷

They reaffirmed that achieving a world without nuclear weapons is a common goal for the international community and that a non-discriminatory, multilateral and effectively verifiable treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices would represent a significant practical contribution to nuclear disarmament and non-proliferation efforts amid the heightened risk of destabilization.

- \geq To this end, the participants confirmed that they would work closely together to realize the common objectives of the group, which are to maintain and enhance political attention to an FMCT as a priority action to forestall a recurrence of a nuclear arms race, and to contribute to expanding the support for the immediate commencement of negotiations on an FMCT. They underlined their expectations that the Conference on Disarmament will take this forward as a matter of priority in its work, in a manner consistent with CD/1299.
- The participants also welcomed actions and efforts taken thus far, inter alia, voluntary moratoria on the production of fissile material for nuclear weapons or other nuclear explosive devices, dismantling or conversion for peaceful uses of facilities for the production of such fissile material and substantive proposals on an FMCT, as important interim steps pending the entry into force of an FMCT, as well as reporting on stockpiles of civil plutonium. In this regard, they encouraged relevant States to take concrete actions,

³⁰⁵ "Foreign Minister Kamikawa's Attendance at the UN Security Council (UNSC) Ministerial Meeting," Ministry of Foreign Affairs of Japan, March 18, 2024, https://www.mofa.go.jp/dns/ac_d/p ageite_000001_00216.html.

³⁰⁶ "Prime Minister Kishida Attends the High-Level Launch Meeting of the Friends of a Fissile Material Cut-off Treaty (FMCT)," Ministry of Foreign Affairs of Japan, September 23, 2024, https://www.mofa.go.jp/dns/ac_d/page4e_001472_00001.html.

³⁰⁷ "Joint Press Release on the Friends of FMCT," Ministry of Foreign Affairs of Japan, September 23, 2024, https://www.mofa.go.jp/mofaj/files/100728869.pdf.

including engaging in transparency and confidence building measures, as called for by over 140 nations in UN General Assembly resolution 78/28 in 2023.

The Friends of FMCT, a cross-regional group with the participation of both nuclearweapon States and non-nuclearweapon States, remain open to working with countries and partners to advance the long overdue objective of launching negotiations of an FMCT.

At the 2024 NPT PrepCom, Argentina, Canada, Japan, the Republic of Korea and the EU submitted a working document entitled "Towards a Fissile Material Cutoff Treaty", which called on all relevant states to immediately begin negotiations on an FMCT in the CD, as well as to declare and maintain a moratorium on the production of fissile material for weapons purposes.³⁰⁸

At the 2023 table UNGA, a resolution, titled "Treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices,"³⁰⁹ which called for the immediate commencement of FMCT negotiations at the CD and the declaration of a moratorium on the production of fissile material for nuclear weapons, was adopted with 160 countries in favor, 5 against (China, Iran, Pakistan, Russia and others) and 20 abstentions (including Egypt, Israel, North Korea Russia and Syria).

B) Moratoria on the production of fissile material for nuclear weapons

As in the previous year, China, India, Israel, Pakistan and North Korea have not declared a moratorium on the production of fissile material for nuclear weapons in 2024. Among those countries, at least India, Pakistan and North Korea are seen as highly likely to continue producing fissile material for nuclear weapons.

It is considered that China does not currently produce fissile material for nuclear weapons. However, there are also concerns that the advanced fast-breeder reactors and reprocessing facilities that China is developing and constructing for civilian purposes can be diverted for nuclear weapons purposes.³¹⁰ The first fast breeder reactor (CFR-600) is expected to begin operating in 2023, and the second fast breeder reactor is scheduled to begin operations in 2026. At the 2024 NPT PrepCom, China stated that a moratorium is impossible to define or verify, and that it weakens the political will to negotiate a treaty.

India is thought to be producing both highly-enriched uranium (HEU) and weapons-grade plutonium. In March 2024, it began construction of the first 500megawatt fast breeder reactor prototype at the Indira Gandhi Centre for Atomic Research, near Kalpakkam. The reactor core was loaded. If the new reactor is operated effectively, it could significantly

³⁰⁸ NPT/CONF.2026/PC.II/WP.12, May 28, 2024.

³⁰⁹ A/RES/78/28, December 4, 2023.

³¹⁰ See, for instance, The U.S. Department of Defense, *Military and Security Developments Involving the People's* Republic of China 2022, p. 97.

increase India's future plutonium production. The director of the research center has additionally stated that six more fast breeder reactors will become operational within the next 15 years.³¹¹

North Korea is considered to have produced fissile material for nuclear weapons and conducted related activities in 2024, as it has in previous years.

Regarding the experimental light-water reactor (ELWR) at Yeongbyeon, which was confirmed to be in operation at the end of 2023, Director General Rafael Grossi pointed out at the IAEA Board of Governors meeting in March 2024 that "[t]he Agency has observed that the 5MW(e) reactor at Yongbyon was not operating between mid-August and mid-October. Our experts believe this would provide sufficient time to refuel the reactor and start its seventh operational cycle. After the irradiated fuel that has been withdrawn from the reactor has been allowed to cool for several months it is able be reprocessed."³¹²

reported that, based on information from satellite images and other sources, North Korea had begun construction of a new suspect enrichment facility in Kangson, where there is already an alleged enrichment facility, in February 2024 or later.³¹³ In September, KCNA reported that Supreme Leader Kim Jong Un had inspected a nuclear weapons research center and a production base for weapons-grade nuclear materials.³¹⁴ U.S. experts have analyzed that the centrifuges inspected were of a more advanced design. It is highly likely that they were designed and manufactured by North Korea, and that some imported materials were used despite the strict sanctions.³¹⁵

None of the NWS/nuclear-armed states have declared the amount of fissile material for nuclear weapons under their possession, except for the United States, which declassifies the amount of its past production of HEU and plutonium. Estimates by researches institutes are summarized in Chapter 3 of this Report.

Regarding uranium enrichment, it was

³¹¹ Hans M. Kristensen, Matt Korda, Eliana Johns, and Mackenzie Knight, "Indian Nuclear Weapons, 2024," *Bulletin of the Atomic Scientists*, September 5, 2024, https://thebulletin.org/premium/2024-09/indian-nuclear-weapons-2024/.

³¹² "IAEA Director General's Introductory Statement to the Board of Governors," IAEA, November 20, 2024, https://www.iaea.org/newscenter/statements/iaea-director-generals-introductory-statement-to-the-board-of-governors-20-november-2024.

³¹³ Colin Zwirko, "North Korea Expanding Suspected Uranium Enrichment Site, Satellite Imagery Shows," *NK Pro,* March 26, 2024, https://www.nknews.org/pro/north-korea-expanding-suspected-uranium-enrichment-site-satellite-imagery-shows/.

³¹⁴ "Press Review - He Inspected the Nuclear Weapons Institute and a Production Base of Weapon-Grade Nuclear Materials," *KCNA*, September 13, 2024, http://www.kcna.kp/en/article/q/6fdb24 c01994aa0921a262e0ae4483851cfd6beecb3161b69e582ab5b8ecfeda66f204dfcc679545777f87d46c8e8197 .kcmsf.

³¹⁵ Olli Heinonen, Jack Liu, Peter Makowsky, Jenny Town, and Martyn Williams, "First Look at North K orea's Uranium Enrichment Capabilities," *38 North,* September 13, 2024, https://www.38north.org/2024 /09/first-look-at-north-koreas-uranium-enrichment-capabilities/.

(10) Transparency in Nuclear Forces, Fissile Material for Nuclear Weapons, and Nuclear Strategy/Doctrine

There was no significant change in the basic transparency policies of the five NWS. China, which has faced criticism for being less transparent than the other NWS on nuclear matters, emphasizes the importance of transparency in intentions and policies. However, it has not disclosed information on the types and number of its nuclear arsenals, or its concrete plans for modernizing its nuclear forces.

The United States released newly declassified information on the U.S. nuclear weapons stockpile in August to update the information that was previously released in October 2021. According to this, as of September 2023, the U.S. stockpile of nuclear warheads stood at 3,748. Between fiscal years 1994 and 2023, the United States dismantled 12,088 nuclear warheads. Since September 30, 2020, the United States has dismantled 405 nuclear warheads. Approximately 2,000 additional nuclear warheads are currently retired and awaiting dismantlement.³¹⁶

In the meantime, the United Kingdom reiterated its policy, as following: "We are deliberately ambiguous about precisely when, how and at what scale we would use our weapons. Alongside our decision to no longer publicise figures for our operational stockpile or deployed warheads, this posture enhances our deterrent effect by complicating the calculations of potential aggressors, thereby reducing the risk of deliberate nuclear use by those seeking a first-strike advantage."³¹⁷

At the 2024 NPT PrepCom, Austria, Japan and the United States submitted their respective national reports. Australia, Austria, Brazil, Canada, Egypt, Germany, Japan, South Korea, Mexico, the Netherlands, New Zealand, Norway, Sweden, Switzerland and other countries issued a "Joint Statement on Transparency and Accountability," calling on NWS to improve transparency.³¹⁸

In its working paper, the Non-Proliferation and Disarmament Initiative (NPDI) included a template, titled "Future national reporting templates on implementation of the Treaty on the Non-Proliferation of Nuclear Weapons: suggested coverage of topics for different categories of States parties to the Treaty—indicative matrix."³¹⁹ In addition, the NAC stated, "Improved transparency and measurability of nuclear-weapon States' implementation of nuclear disarmament obligations and

³¹⁶ NNSA, "Transparency in the U.S. Nuclear Weapons Stockpile," 2024, https://www.energy.gov/ nnsa/transparency-us-nuclear-weapons-stockpile.

³¹⁷ Defence Nuclear Enterprise, "Delivering the UK's Nuclear Deterrent as a National Endeavour," March 2024, p. 5.

³¹⁸ "Joint Statement on Transparency and Accountability," Consideration of the draft report on the results of the Preparatory Committee, Second PrepCom for the 11th NPT RevCon, August 2, 2024.

³¹⁹ NPT/CONF.2026/PC.I/WP.18, June 29, 2023.

commitments would contribute to greater accountability in the Treaty and its full implementation. This would help build mutual trust among States parties."³²⁰ Brazil stated that "accountability ensures that commitments made are commitments kept. The need for transparency has been amply recognized in numerous occasions in the NPT review process. We therefore urge all nuclear weapon States to present their national reports and subject them to interactive discussion at the first available opportunity during this Review Cycle."³²¹

At the 2012 NPT PrepCom, the NPDI proposed a draft form for reporting on nuclear warheads, delivery vehicles, fissile material for nuclear weapons and nuclear strategy/policies.³²² Using that draft form, the following table summarizes the degree of transparency taken by the nuclear-weapon states.

³²⁰ NPT/CONF.2026/PC.II/WP.2, May 16, 2024.

³²¹ "Statement by Brazil," Second PrepCom for the 11th NPT RevCon, July 22, 2024.
³²² NPT/CONF.2015/PC.I/WP.12, April 20, 2012.

Table 1-6: Transparency in nuclear disarmament

Nuclear warheads	CHN	FRA	RUS	UK	US	IND	ISR	PAK	PRK
Total number of nuclear warheads (including those awaiting dismantlement)		0							
Aggregate number of nuclear warheads in stockpile		0		\triangle	\triangle				
Number of strategic or non-strategic nuclear warheads		0		\triangle	\triangle				
Number of strategic or non-strategic deployed nuclear warheads		0		\bigtriangleup	\triangle				
Number of strategic or non-strategic non-deployed nuclear warheads		0		\triangle	\triangle				
Reductions (in numbers) of nuclear warheads in 2024			0		0				
Aggregate number of nuclear warheads dismantled in 2023 or 2024									
Delivery vehicles									
Number of nuclear warhead delivery systems by type (missiles, aircraft, submarines, artillery, other)		0	\triangle	0	0				
Reduction (in numbers) of delivery systems in 2024									
Aggregate number of delivery systems dismantled in 2023 or 2024									
Nuclear disarmament since 1995									
1995 - 2000		0	0	0	0				
2000-2005		0	0	0	0				
2005-2010		0	0	0	0				
2010 - 2020		0	0	0	0				
2020 - 2023		Ŭ	0	Ŭ	0				
Nuclear doctrine	i	i	Ŭ		Ű				i
Measures taken or in process to diminish the role and significance of nuclear				0	0	0		0	
weapons in military and security concepts, doctrines and policies	0	0	0	0	0	0		0	
Measures taken or in process to reduce the operational readiness of the reporting State's nuclear arsenal	0	0	0	0	0	0		0	
Measures taken or in process to reduce the risk of accidental or unauthorized	0	0	0	0	0	0		0	
use of nuclear weapons Description of perative security assurances (including status and definition) by	-	-	-	-	-	-		-	_
reporting States	0	0	0	0	0	0		0	0
Current status and future prospect of the ratification of the relevant protocols	0	0	0	0	0	_	—	_	—
Current status of consultations and cooperation on entry into force of the	0	0	0	0	0	_		_	_
relevant protocols of nuclear-weapon-free-zone treaties	\cup	\bigcirc	\bigcirc	0	0				
of nuclear weapon-free-zone treaties by concerned States						—	—	—	—
Nuclear testing									
Current status of ratification of the Comprehensive Nuclear-Test-Ban Treaty	\triangle	0	\triangle	0	\triangle		\triangle		
Current status of the reporting State's policy on continued adherence to the	0	0	0	0	0	0		0	
Activities to promote the entry into force of the Comprehensive Nuclear-Test-			~	0	0				
Ban Treaty at the national, regional and global levels			0	0	0				
Scheduled policy reviews									
Scope and focus of policy reviews, scheduled or under way, relating to nuclear weapon stocks, nuclear doctrine or nuclear posture									
Fissile material		•							•
Aggregate amount of plutonium produced for national security purposes (in				0	0				
metric tons)				0	Ŭ				
tons)				0	0				
Amount of fissile material declared excess for national security purposes (in			\triangle		\triangle				
Current status (and any future plan), including the amount and year, of									
declarations to the International Atomic Energy Agency of all fissile material									
and placement of such material under Agency or other relevant international		0	\bigtriangleup	0	\triangle				
verification and arrangements for the disposition of such material for peaceful									
purposes Current status of the development of appropriate legally binding verification									
arrangements to ensure the irreversible removal of such fissile material					Δ				
Current status (and any future plan) of the dismantlement or conversion for peaceful uses of facilities for the production of fissile material for use in nuclear		0							
weapons									
Other measures in support of nuclear disarmament									
Any cooperation among Governments, the United Nations and civil society aimed at increasing confidence, improving transparency and developing				\cap	0				
efficient verification capabilities		Ŭ		J	Ŭ				
Year and official document symbol of regular reports on the implementation of Article VI paragraph 4(c) of the 1995 decision entitled "Principles and									
objectives for nuclear nonproliferation and disarmament," and the practical									
steps agreed to in the Final Document of the 2000 Review Conference in 2019				0	0				
Activities to promote disarmament and non-proliferation education		0		0	U				

 $[\bigcirc:$ Highly transparent $\triangle:$ Partially transparent]

(11) Nuclear Disarmament Verification

Only the U.S.-Russian New START stipulates nuclear disarmament verification measures, including on-site inspections. Since its entry into force, both countries have conducted on-site inspections as required by the treaty. However, as mentioned above, on-site inspections have been suspended since April 1, 2020. (See Section 5 (A) of this chapter.)

One notable activity on verification is the "International Partnership for Nuclear Disarmament Verification" (IPNDV) launched by the United States in December 2014. With 28 participating countries (plus the EU and the Vatican),³²³ the IPNDV continues to study verification measures and technologies related to dismantling nuclear weapons, as well as fissile material derived from dismantled nuclear warheads.

NTI President and COO Joan Rohlfing as well as more than 100 experts from 20 countries gathered in Geneva to mark the 10th anniversary of the IPNDV, a publicprivate partnership between NTI and the U.S. Department of State with 30 partner countries. The program also included a panel of Geneva-based ambassadors and government officials discussing the value of the IPNDV, presentations by IPNDV partners on their progress in developing verification processes and evaluating technologies, and an arms control research symposium. The event also included the release of a video about the partnership and a report on key insights from its decade of work.³²⁴

At the 2024 NPT PrepCom, the United States and Switzerland jointly submitted a working document, which stated the following:³²⁵

The International Partnership for Nuclear Disarmament Verification has produced a report, "Verification of nuclear disarmament: insights from a decade of the International Partnership for Nuclear Disarmament Verification,"³²⁶ to provide a detailed exploration of its work to date. The report highlights the partners' progress in:

• Developing a set of verification concepts and models to guide the development and implementation of nuclear disarmament verification mechanisms;

• Identifying, assessing and testing a broad spectrum of verification measures and technology options for use in meeting future monitoring and inspection

³²³ In addition to three NWS (France, the United Kingdom and the United States), participating countries include Australia, Brazil, Canada, Germany, Indonesia, Japan, Kazakhstan, South Korea, Mexico, the Netherlands, Norway, Poland, Sweden, Switzerland, Turkey, and the UAE. China and Russia attended in Phase I (2015-2017) as observers but did not join in Phase II (2018-2019).

³²⁴ "NTI in Geneva to Celebrate the IPNDV's 10 Years of Progress," *NTI*, June 28, 2024, https://www.nti.org/news/nti-in-geneva-to-celebrate-the-ipndvs-10-years-of-progress/.

³²⁵ NPT/CONF.2026/PC.II/WP.7, May 28, 2024.

³²⁶ "Verification of Nuclear Disarmament," IPNDV, June 1, 2024, https://www.ipndv.org/wp-content/uploads/2024/06/IPNDV-Capstone_FINAL-1.pdf.

requirements;

• Identifying and testing a set of managed access procedures to ensure that proliferation-sensitive and other sensitive information is effectively protected during nuclear disarmament verification activities;

• Building necessary international capacity as a foundation for multilateral verification, reflecting the recognition that every country has a role to play in the verification of future nuclear disarmament agreements;

• Evaluating and optimizing the overall effectiveness and efficiency of a prospective monitoring and verification system as a whole; and

• Continually adapting its activities to address new issues and problems, carrying forward its founding mission of understanding the technical and procedural challenges for the effective verification of nuclear disarmament and developing practical solutions for those challenges

[...] While the current phase of its work will wrap up at the end of 2025, much work remains to be done. All of the partners are committed to continuing our work, looking to launch phase IV in early 2026. It is equally important for all States to continue to support additional work regarding nuclear disarmament verification in other forums. The Review Conference should endorse such work.

In another effort on nuclear disarmament verification, the United Kingdom, the United States, Norway and Sweden launched the "Quad Nuclear Verification Partnership" initiative in 2015 and have continued its work since then. In addition, France and Germany conducted the Nuclear Disarmament Verification Exercise (NuDiVe) in September 2019 and April 2022 within the framework of the IPNDV.³²⁷

However, Russia voiced criticism regarding the ongoing efforts in the realm of nuclear disarmament verification, stating:

Any ideas involving

"compartmentalized" development of some "universal" measures of nuclear arsenals transparency and nuclear disarmament verification, appear to be equally inadequate. What we have here at hand is highly sensitive national security aspects that should not be addressed without due regard for strategic situation and outside any substantive negotiations on specific future arms control and disarmament agreements.

Any further practical results in the reduction of nuclear weapons and ultimately their complete, transparent and verifiable elimination can only be achieved on the basis of a consensus, realistic sequence of actions and carefully calibrated step-by-step approach. Furthermore, this collaboration will need to involve all the States possessing military nuclear capabilities.³²⁸

At the NPT PrepCom, the NAM countries requested the IAEA's involvement in developing verification measures, including those applied to fissile

³²⁷ NPT/CONF.2020/WP.18/Rev.1, July 7, 2022.

³²⁸ "Statement by Russia," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 25, 2024.

material removed from nuclear weapons programs. They also called for the establishment by the NPT RevCon of a standing committee to monitor and verify the nuclear disarmament steps undertaken unilaterally or through bilateral agreements by the NWS.³²⁹

(12) Irreversibility

In their joint statement submitted to the NPT PrepCom, Australia, Austria, Brazil, Ireland, Mexico, the Philippines, Sweden, Norway and the United Kingdom made the following statement regarding the importance of irreversibility in nuclear disarmament:

Efforts to understand irreversibility, like transparency and verification, are not an end in themselves. They are not a prerequisite to commence nuclear disarmament, in compliance with the spirit and letter of article VI of the NPT. Nor are they a pre-requisite to implement the obligations and commitments agreed within the framework of the treaty. We are convinced that the implementation of these obligations and commitments will benefit from work already having been done on these three principles and ensuring the implementation to be more effective and sustainable.

We reiterate the central importance of applying the agreed principles of transparency, verifiability, and irreversibility to any nuclear disarmament efforts, and towards the sustainability of all pillars of the NPT.

We are, therefore, supportive of enhanced dialogue among States parties to build a common understanding of the application of irreversibility, in its technical, legal, normative and political dimensions.

We understand irreversibility in nuclear disarmament as a spectrum. It can be enhanced, but nothing is ever truly irreversible. The capacity to develop nuclear weapons cannot go to zero, but weapons can be irreversibly eliminated in a verifiable and transparent manner.

We also highlight that while all states have an interest in attaining and maintaining a world without nuclear weapons, the main focus of such a dialogue would be on irreversibility in the actions and activities of nuclear-weapon States to implement their agreed obligations and commitments on nuclear disarmament.³³⁰

The United States expressed its support for this group statement on the irreversibility of nuclear disarmament.³³¹

A) Implementing or planning dismantlement of nuclear warheads and their delivery vehicles

As with their previous nuclear arms control agreements, the New START obligates Russia and the United States to dismantle or convert strategic nuclear

³²⁹ NPT/CONF.2026/PC.II/WP.29, June 24, 2024.

³³⁰ "Joint Statement by Norway on behalf of Australia, Austria, Brazil, Ireland, Mexico, the Philippines, Sweden, Norway and the United Kingdom," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 24, 2024.

³³¹ "Statement by the United States," Cluster 1, Second PrepCom for the 11th NPT RevCon, July 24, 2024.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of nuclear weapons stockpile*	5,113	5,066	4,897	4,881	4,804	4,717	4,571	4,018	3,822	3,785	3,805	3,750
Number of warheads dismantled	356	352	305	308	239	299	146	533	196	243	284	184

Table 1-7: U.S. nuclear weapons stockpile and warhead dismantlement

*Does not include weapons retired and awaiting dismantlement.

Sources: NNSA, "Transparency in the U.S. Nuclear Weapons Stockpile."

delivery vehicles beyond the limits set in the treaty, and to do so in a verifiable way. The New START does not require the dismantlement of retired nuclear warheads, but the two states have partially dismantled retired nuclear warheads as unilateral measures. Following 2021, the number of nuclear warheads disposed of each year was announced in August 2024. According to the announcement, "[f]rom fiscal year 1994 to fiscal year 2023, the United States dismantled 12,088 nuclear warheads. Since September 30, 2020, the United States has dismantled 405 nuclear warheads.332 It was also revealed that "around 2,000 more nuclear warheads have been retired and are awaiting dismantlement."333 Although the United States destroyed 69 nuclear warheads in 2023, it has also been noted that the pace of nuclear warhead disposal by the United States has slowed significantly.³³⁴

The other NWS did not release any information regarding nuclear weapons dismantlement. However, France and the United Kingdom have dismantled their retired nuclear warheads and delivery vehicles. France also mentioned, in its national report submitted to the NPT RevCon in 2022, that it had begun dismantling its M4 SSBN.³³⁵

B) Decommissioning/conversion of nuclear weapons-related facilities

No remarkable activity or progress was reported in 2024 in terms of decommissioning or converting nuclear weapons-related facilities. In its working paper submitted to the NPT PrepCom, the EU "[proposes to provide] the amount and types of weapons, delivery systems and nuclear weapon-related facilities dismantled and reduced as part of nuclear disarmament efforts, as well as any additional relevant information."³³⁶

In 1996, France became the only country to decide to completely and irreversibly dismantle its nuclear test sites, which were

 ³³² NNSA, "Transparency in the U.S. Nuclear Weapons Stockpile," 2024, https://www.energy.gov/ nnsa/transparency-us-nuclear-weapons-stockpile.
 ³³³ Ibid.

³³⁴ Hans M. Kristensen and Matt Korda, "Nuclear Notebook: United States Nuclear Weapons, 2023," *Bulletin of the Atomic Scientists*, January 16, 2023, https://thebulletin.org/premium/2023-01/nuclear-notebook-united-states-nuclear-weapons-2023/.

³³⁵ NPT/CONF.2020/42/Rev.1, August 1, 2022.

³³⁶ NPT/CONF.2026/PC.II/WP.6, May 29, 2024.

fully decommissioned in 1998.³³⁷ In its national report submitted to the NPT RevCon, France reported that it has engaged in decommissioning operations for the former fissile material production facilities for nuclear weapons, including its uranium enrichment facility, reprocessing facility and plutonium production reactor.³³⁸ The United States also reported the following: "In 1980, the nuclear complex was made up of 14 sites. Today, it consists of eight, and its workforce has been reduced by two-thirds since the end of the Cold War."³³⁹

C) Measures for fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes

In October 2016, Russian President Putin issued a Presidential Decree on suspending implementation of the Russian-U.S. Plutonium Management and Disposition Agreement (PMDA), which entered into force in July 2011.³⁴⁰ This situation has not been resolved.

In the meantime, as mentioned in the *Hiroshima Report 2021*, the United States formally terminated construction of the Mixed Oxide Fuel Fabrication Facility (MFFF) at the Savannah River Site in South Carolina in 2018. The NNSA has proposed to repurpose the MFFF to produce plutonium pits.

Meanwhile, South Africa criticized the NWS's activities, stating:

It is regrettable that little progress has been made to implement the actions agreed to at the 2000 and 2010 NPT Review Conferences on the development of appropriate verification arrangements with the IAEA to ensure the irreversible removal of fissile material designated by each nuclear-weapon State as no longer required for military purposes. Neither has there been progress concerning the additional declarations 3 of stockpiles of fissile material that could be used in nuclear weapons or other nuclear explosive devices. On the contrary, the Safeguards Implementation Report 2023 reflects that some nuclear-weapon States have withdrawn such material. It is therefore incumbent on nuclear-weapon States to refrain from such withdrawals and to apply the principles of irreversibility, verifiability and transparency in accordance with their NPT obligations in this regard.341

The NAM also said that "nuclear risk reduction measures, including reductions in deployments and in operational status cannot substitute for irreversible cuts in, and the total elimination of, nuclear weapons and, accordingly, calls on the nuclear-weapon States to apply the principles of transparency, irreversibility and verifiability to all such cuts, to further

³³⁷ NPT/CONF.2015/10.

³³⁸ NPT/CONF.2020/42/Rev.1, August 1, 2022.

³³⁹ NPT/CONF.2020/47, December 27, 2021.

³⁴⁰ This decree stipulates, inter alia, that 34 tons each of surplus U.S. and Russian plutonium extracted from dismantled nuclear warheads shall be converted into mixed oxide (MOX) fuel for use in civilian nuclear reactors.

³⁴¹ "Statement by South Africa," Cluster 2, Second PrepCom for the 11th NPT RevCon, July 26, 2024.

reduce their nuclear arsenals, both warheads and delivery systems, thus contributing to the fulfillment of their nuclear disarmament obligations and facilitating the realization of a world free of nuclear weapons at the earliest date.³³⁴²

(13) Disarmament and Non-Proliferation Education and Cooperation with Civil Society

Increased emphasis has been placed on disarmament and non-proliferation education, as well as on the importance of diversity and inclusion, and cooperation with civil society in disarmament and nonproliferation.

In its working paper submitted to the NPT PrepCom, Japan introduced its various efforts to date regarding disarmament and non-proliferation education. Japan established the "Youth Leader Fund for a World without Nuclear Weapons" in March 2023. "The primary goal of this multi-year programme is to bring future leaders from both nuclearweapon States and non-nuclear-weapon States to Japan to learn first-hand the realities of nuclear weapon use and bring the lessons of Hiroshima and Nagasaki to the rest of the world. In this way, it will contribute to nuclear disarmament, and international peace and security more broadly, through enhanced engagement with youth, education and future leadership."³⁴³ The 100 participants of the first cohort (2023–2025) were selected in 2023 from over 2,000 applicants. They are between the ages of 18 and 29 and come from 63 countries, including both nuclearweapon states and non-nuclear-weapon states. The participants of this program visited Hiroshima and Nagasaki in August 2024.³⁴⁴

An international conference was held in Hiroshima, where a youth declaration called "DeclarACTION" was announced. It set out a concrete action plan to achieve a world without nuclear weapons. This declaration was made up of three pillars: "citizen participation and A-bomb survivor testimony," "youth participation in political and diplomatic processes," and "research and academia." Specific proposals were presented for each item.345 Furthermore, Japan also established the "Japan Chair for a world without nuclear weapons" in 2023, contributing \$22 million dollars to the selected international research institutes and think tanks.346 Japan aims to disseminate the research outcomes.

³⁴² NPT/CONF.2026/PC.II/WP.22, June 26,2024.

³⁴³ NPT/CONF.2026/PC.II/WP.3, May 20, 2024.

³⁴⁴ "Video Message from Prime Minister Kishida at the Opening Ceremony of the Japan Visit Programme (Study Tour to Hiroshima and Nagasaki) of the "Youth Leader Fund for a World without Nuclear Weapons," Ministry of Foreign Affairs of Japan, August 26, 2024, https://www.mofa.go.jp/dns/ac_d/pageite_000001_00544.html.

³⁴⁵ "Global Youth Leaders Call for United Action for a Peaceful Future without Nuclear Weapons," UNITAR, August 30, 2024, https://unitar.org/about/news-stories/news/global-youth-leaders-call-united-action-peaceful-future-without-nuclear-weapons.

³⁴⁶ NPT/CONF.2026/PC.II/WP.3, May 20, 2024.

In addition to Japan's initiative, at the NPT PrepCom, the NPDI, South Korea, Sweden and other countries also emphasized the importance of nuclear disarmament and non-proliferation education. Other countries, mainly Western countries, also highlighted the importance of gender issues at the NPT PrepCom.

At the 2024 UNGA, the resolution titled "United Nations study on disarmament and non-proliferation education," which fosters further promotion of disarmament and non-proliferation education as well as engagement of youth, was adopted by consensus.³⁴⁷ The UNGA resolution on nuclear disarmament led by Japan stated the following on disarmament and nonproliferation education:

Calls upon all States to facilitate efforts on nuclear disarmament and nonproliferation education, which is a useful and effective means to advance the goals of the Treaty on the Non-Proliferation of Nuclear Weapons in support of achieving a world without nuclear weapons, inter alia, efforts in which the young generation can actively engage, including through dialogue platforms, mentoring, internships, fellowships, scholarships, model events and youth group activities, as well as to raise awareness of the realities of the use of nuclear weapons, including through, among others, visits by leaders, youth and others to and interactions with

communities and people, including the hibakusha, those who have suffered the use of nuclear weapons irrespective of their nationalities and origins, and who pass on their experiences to the future generations through long-standing grassroots efforts around the world, including those of Nihon Hidankyo, recognized with the Nobel Peace Prize 2024, and welcomes concrete measures in this regard, inter alia, the Young Professionals Network of P5 academics, the Youth4Disarmament Initiative, "Disarmament education: resources for learning" and the "Youth Leader Fund for a world without nuclear weapons."

At the NPT PrepCom³⁴⁸ and the UNGA First Committee,³⁴⁹ which were held in 2024, side events were held with the participation of non-governmental organizations (NGOs), while some participating countries hosted meetings.

Regarding cooperation with civil society, one of the important efforts required from governments is to provide more information on nuclear disarmament and non-proliferation issues. Among those surveyed in this report, the following countries have set up one or several sections on disarmament and nonproliferation on their official Englishlanguage homepages and posted educational information: Australia, Austria, Canada, China, France, Germany, Japan, New Zealand, Sweden, Switzerland, the United Kingdom and the United

³⁴⁷ A/RES/79/28, December 2, 2024.

³⁴⁸ Australia, Austria, France, Japan, Kazakhstan, New Zealand, South Korea, Norway, Switzerland, the United Kingdom, the United States, and others hosted side events.

³⁴⁹ Australia, Austria, Japan, the United States, and others hosted side events.

States. In addition, the UNGA resolutions on nuclear disarmament proposed by Japan and the NAC respectively emphasized the importance of disarmament and non-proliferation education.

Finally, a few countries started to legislate for "divestment" from organizations or companies involved in producing nuclear weapons. However, a report published by ICAN in February 2024 and June 2023 summarized the following:³⁵⁰

- Between January 2021 and August 2023, 287 banks, pension funds, insurance companies, asset managers and other financial institutions had financing or investment relations with one or more of the 24 nuclear weapon producing companies profiled in this report, down from 306 institutions in previously published results.
- Investors held \$476,843 million in shares and bonds in the 24 nuclear weapon producing companies, an increase of \$15.7 billion since the last Don't Bank on the Bomb financial analysis.
- During the analyzed period, \$276,155 million was provided to the 24 nuclear weapon manufacturers in loans and underwriting, a drop of \$9.4 billion since the last Don't Bank on the Bomb financial analysis.

(14) Hiroshima and Nagasaki Peace Memorial Ceremonies

On August 6, 2024, the Hiroshima Peace Memorial Ceremony was held in Hiroshima. Representatives from 109 countries and the EU, along with Japan, participated, including:

- Ambassadorial-level—Egypt, Australia, Austria, Canada, Saudi Arabia, India, Israel, Iraq, New Zealand, Norway, South Africa, Sweden, Syria, United Kingdom and United States
- Non-ambassadorial-level—Iran, Germany, Indonesia, Netherlands, Korea, Switzerland, France, Brazil, Poland, Mexico and Turkey
- Not attending—<u>Kazakhstan</u>, China, North Korea, Pakistan (Note: underlines denote countries whose representatives have attended the ceremony at least once in the past three years)

The city of Nagasaki decided not to invite Israel to the Nagasaki Peace Memorial Ceremony scheduled on August 9, citing the need to avoid "the risk of unforeseen events at the ceremony."³⁵¹ Following this decision, the ambassadors of six G7 countries excluding Japan, and the ambassador-level representative of the EU, stated that "the identification of Russia and Israel is unacceptable" and decided not to participate in the ceremony in Nagasaki.³⁵² Since 2022, both

³⁵⁰ PAX and ICAN, Untenable investments: Nuclear weapon producers and their financiers, February 2023.

³⁵¹ Takashi Ogawa, "Nagasaki Won't Invite Israel to Attend Aug. 9 Peace Ceremony," *The Asahi Shimbun,* August 1, 2024, https://www.asahi.com/ajw/articles/15371211.

³⁵² Tim Kelly, "G7 Ambassadors to Miss Nagasaki Atomic Bomb Memorial Over Isarel's Exclusion," *Reuters,* August 8, 2024, https://www.reuters.com/world/g7-ambassadors-miss-nagasaki-atomic-bomb-

Hiroshima and Nagasaki have decided not to invite Russia and Belarus to their ceremonies due to Russia's ongoing invasion of Ukraine and the support provided by Belarus.

On August 9, 2024, 100 countries attended the Nagasaki Peace Memorial Ceremony, including the following:

- Ambassadorial-level— Austria, Brazil, Egypt, India, Netherlands, Norway, Saudi Arabia, South Africa, Sweden, Syria, Turkey.
- Non-ambassadorial-level— Australia, Canada, China, France, Germany, Indonesia, Iran, Poland, South Korea, Switzerland, United Kingdom, United States.
- Not attending— Israel, <u>Kazakhstan</u>, Mexico, New Zealand, North Korea, Pakistan, Russia.

At various fora, Japan has proposed that world political leaders visit Hiroshima and Nagasaki to witness the humanitarian consequences of using nuclear weapons. On April 19, 2024, U.S. Ambassador to the UN Thomas-Greenfield became the first U.S. ambassador to the UN (cabinetlevel) to visit Nagasaki's Peace Park, Peace Statue and Atomic Bomb Museum, and said: "We must work together to create an environment for nuclear disarmament and prevent the proliferation of nuclear weapons in all parts of the world. It is being done."³⁵³ In August, former British Prime Minister Liz Truss visited Hiroshima's Peace Memorial Park for the first time, touring the Atomic Bomb Museum and laying flowers at the Atomic Bomb Cenotaph.

memorial-over-israels-exclusion-2024-08-08/.

³⁵³ "US Envoy to UN Visits Nagasaki A-Bomb Museum," *The Asahi Shimbun*, April 20, 2024, https://www.asahi.com/ajw/articles/15238445?msockid=0f2a8046f9cf670b14fa95d0f8c066eb.

Chapter 2

Nuclear Non-Proliferation¹

(1) Acceptance and Compliance with Nuclear Non-Proliferation Obligations

A) Accession to the NPT

The Nuclear Non-Proliferation Treaty (NPT) has 191 states parties (including North Korea, the Holy See and Palestine). Among the current 193 United Nations (UN) Member States, those remaining outside the NPT are: India and Pakistan, both of which tested and declared they had nuclear weapons in 1998; Israel, which is widely believed to possess them despite its opaque nuclear policy; and South Sudan, which declared its independence and joined the UN in July 2011, and does not possess any nuclear weapons.

North Korea declared its withdrawal from the NPT in 2003, but there is no agreement among the states parties on North Korea's official status with regard to the NPT. It has refused to return to the treaty despite UN Security Council resolutions (UNSCRs) demanding that it do so at an early date. As noted below, it has repeatedly insisted that it will not abandon its status as a nuclear-armed state. There is no agreement among the states parties on North Korea's official NPT status.

B) Compliance with Articles I and II of the NPT and the UNSCRs on nonproliferation

North Korea

Since the NPT entered into force, no case of non-compliance with Articles I and II of the Treaty has been officially reported by the UN or any other international organization.² However, if North Korea's withdrawal is interpreted as not being legally valid, or if it acquired nuclear weapons before announcing its withdrawal from the NPT, such acquisition of nuclear weapons would constitute non- compliance with Article II. The U.S. Department of State in its annual reports titled "Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments," declared that North Korea was in violation of its obligations under Articles II and III of the NPT and in non-compliance with its International Atomic Energy Agency (IAEA) Safeguards Agreement at the time it announced its withdrawal from the NPT in $2003.^{3}$

UNSCR 1718, adopted in October 2006, stipulates that: "[T]he DPRK shall abandon all nuclear weapons and existing nuclear programmes in a complete, verifiable and irreversible manner, shall act strictly in accordance with the obligations applicable to parties under the Treaty on

¹ This chapter is authored by Masahiro Okuda and Hirofumi Tosaki.

 $^{^2}$ No international body is explicitly mandated with a responsibility for assessing compliance with these articles, apart from the IAEA's safeguards verification mandate.

³ The U.S. Department of State, Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments, April 2023, p. 13.

the Non-Proliferation of Nuclear Weapons and the terms and conditions of its Safeguards Agreement (IAEA INFCIRC/403) and shall provide the IAEA transparency measures extending beyond these requirements, including such access to individuals, documentation, equipments and facilities as may be required and deemed necessary by the IAEA." The UN Security Council also decided that North Korea "shall suspend all activities related to its ballistic missile programme and in this context reestablish its pre-existing commitments to a moratorium on missile launching."⁴

On several occasions in 2024, North Korea insisted that it would not relinquish its nuclear arsenal. At the Plenary Session of the Central Committee of the Worker's party, Kim Jong Un stated, the following as the policy on nuclear weapons of the Korean People's Army: "it stressed the need for the nuclear weapons field to lay a reliable foundation for steadily increasing the production of nuclear weapons and wage a vigorous struggle for carrying out the nuclear weapons production plan in 2024."⁵ On May 27, a Foreign Ministry statement was issued, in which Pyongyang criticized the discussion of denuclearization of the Korean Peninsula at the Japan-China-South Korea Summit Meeting held on the same day, and declared itself as a "nuclear weapon state [sic]." In this statement, North Korea also argued that the discussion mentioned above was "infringement upon sovereignty" to pressure North Korea to denuclearize and asserted that "complete denuclearization of the Korean Peninsula has already died out."6 In the general debate at the UN General Assembly in September, North Korea stated that "U.S. hostility and nuclear threat to the DPRK for over 70 years compelled us to make a historic decision to possess nuclear weapons," and that "whoever takes office in the U.S., we will only deal with the state entity called the U.S., not the mere administration."⁷ On September 13, Kim Jong Un inspected a nuclear weapons research facility and a uranium enrichment facility, and emphasized the need to increase the number and separation capability of centrifuges. He also promoted the introduction of centrifuges which were at the final stage of completion to enhance the production

⁴ S/RES/1718, October 14, 2006. The UNSCR 1874 in June 2009 also demanded that North Korea "immediately comply fully with its obligations under relevant Security Council resolutions, in particular resolution 1718 (2006)." Since this resolution also states to "[take] measures under its Article 41," any measures involving the use of armed forces cannot be taken on the basis of this resolution.

⁵ "Report on 9th Enlarged Plenum of 8th WPK Central Committee," *KCNA*, December 31, 2023. http://www.kcna.co.jp/item/2023/202312/news31/20231231-01ee.html. At this plenary session Kim also declared a new policy rejecting the goal of unification with South Korea. He stated: "[t]he north-south relations have been completely fixed into the relations between two states hostile to each other and the relations between two belligerent states, not the consanguineous or homogeneous ones anymore."

⁶ "Press Statement of Spokesperson of DPRK Foreign Ministry," KCNA, May 27, 2024, http://www.kcna.co.jp/item/2024/202405/news27/20240527-11ee.html.

⁷ "Statement by Head of the DPRK Delegation H.E. Mr. Kim Song, Ambassador and Permanent Representative of the Democratic People's Republic of Korea to the United Nations," September 30, 2024.

base for weapon-grade nuclear materials⁸.

At the 2024 NPT PrepCom, 76 countries-including Australia, Austria, Canada, France, Germany, Japan, South Korea, Mexico, the Netherlands, New Zealand, Norway, Poland, Sweden, Switzerland, Turkey, the United Kingdom and the United States-issued a joint statement, stating: "We urge the [DPRK] to take concrete steps towards abandoning all nuclear weapons, ballistic missiles and related programmes in a complete, verifiable and irreversible manner and to immediately cease all related activities in accordance with all relevant Security Council resolutions. [...] We reiterate our steadfast commitment to the objective of the return by the [DPRK] at an early date to and full compliance with the [NPT] and [IAEA].9"

On the other hand, China and Russia repeatedly responded as if they were defending or tacitly endorsing North Korea's nuclear and missile activities. They also opposed the Security Council's efforts to issue a condemnation of North Korea's missile and rocket launches.

On November 4, 2024, the UN Security Council held a discussion on the issue of North Korea following its ballistic missile test in October. Russia defended North Korea by stating that "the missile tests 'causing such upset' cannot be considered separately from the aggressive steps taken by the United States and its satellites in the region," and that "Pyongyang therefore has the right to take steps to ensure its sovereignty."¹⁰

In September, Russian Foreign Minister Sergey Lavrov pointed out the strengthening of extended deterrence by the United States towards Japan and South Korea, and said, "[i]n these conditions the very term of 'denuclearization' as applied to North Korea has lost all meaning. For us, this is a closed issue." He also argued that Russia strongly disagreed with the "senseless" imposition of sanctions by Western countries.¹¹

In the meantime, China continues to oppose the approach of addressing North Korea's nuclear issue mainly through sanctions. Instead, it advocates a "dualtrack approach" which simultaneously aims to achieve a peace agreement and the denuclearization on the Korean Peninsula. At the NPT PrepCom, China stated, "The crux of the nuclear issue on the Korean Peninsula is the lingering remnants of the Cold War, the absence of a peace

⁸ "Respected Comrade Kim Jong Un Inspects Nuclear Weapons Institute and Production Base for Weapon-grade Nuclear Materials," *KCNA*, September 13, 2024, http://www.kcna.co.jp/item/2024/202409/news13/20240913-03ee.html.

⁹ "Joint Statement on addressing the North Korean nuclear challenge," Second PrepCom for the 11th NPT RevCon, July 26, 2024.

¹⁰ "Democratic People's Republic of Korea's Latest Ballistic Missile Launch Represents 'a Grave Threat to Regional Stability', Senior Official Tells Security Council," United Nations Meeting Coverage, November 4, 2024.

¹¹ "Russia's Lavrov Says North Korea's Nuclear Status is a 'Closed Issue,'" *Reuters*, September 27, 2024, https://www.reuters.com/world/russias-lavrov-says-north-koreas-nuclear-status-is-closed-issue-2024-09-26/.

mechanism, and the lack of mutual trust. All parties should strive to restart dialogue, follow the dual track approach, and take phased and synchronized steps to promote the political settlement of the Korean Peninsula issue."¹²

<u>Iran</u>

Nuclear activities

The E3/EU+3 (France, Germany and the United Kingdom/European Union plus China, Russia and the United States) and Iran agreed on the Joint Comprehensive Plan of Action (JCPOA) in July 2015, which stipulates that Iran accepts restrictions on its nuclear activities, including uranium enrichment, and that other parties would ease or lift sanctions against Iran. However, in May 2018 under the first Donald Trump administration, the United States decided to withdraw from the JCPOA and to reimpose sanctions against Iran. In response, from May 2019, Iran gradually suspended the implementation of its obligations set out in the JCPOA, including limitations on the storage and enrichment level of enriched uranium as well as of the number of centrifuges for enriching uranium. (See Section 2 of this chapter regarding suspension of implementation of monitoring and verification measures,

including IAEA safeguards.)¹³

Centrifuges—The JCPOA limited Iran to enriching uranium using only 5,060 first generation (IR-1) centrifuges and only at the Natanz main fuel enrichment plant (FEP). Since September 2019 it has steadily breached these limits.

The IAEA periodical report in November 2024 reported on the centrifuge installation as follows:¹⁴

- FEP: In addition to the 30 cascades of IR-1 centrifuges provided for under the JCPOA, Iran has informed the Agency that it has installed another 58 cascades (IR-1, IR-2m, IR-4 and IR-6).
- Pilot Fuel Enrichment Plant (PFEP): Iran installed four cascades of IR-4, IR-6, and interconnected cascade comprising IR-4 and IR-6.
- FFEP: Iran installed six cascades of IR-1, and two cascades of IR-6 centrifuges.

Enriched uranium—The JCPOA limited Iran's stockpile of enriched uranium to no more than 300 kilograms of uranium hexafluoride (UF6), with a maximum enrichment level of 3.67%. The IAEA estimated Iran's total enriched uranium stockpile as of October 26, 2024 to be 6,604.4 kg, of which the total enriched

¹² "Statement by China," General Debate of the Second PrepCom for 11th NPT RevCon, July 23, 2024.

¹³ Iran justifies that its suspension of obligations was in accordance with Articles 26 and 36 of the JCPOA. Foreign Minister Mohammad Javad Zarif also stated, "Iran has significantly increased its nuclear capabilities since May 2019—but it has done so in full conformity with paragraph 36 of the nuclear agreement, which allows Iran to "cease performing its commitments" under the deal should another signatory stop performing its own. If the new U.S. administration hopes to alter the current trajectory, it needs to promptly change course." Mohammad Javad Zarif, "Iran Wants the Nuclear Deal It Made: Don't Ask Tehran to Meet New Demands," *Foreign Affairs*, January 22, 2021, https://www.foreignaffairs.com/articles/iran/2021-01-22/iran-wants-nuclear-deal-it-made.

¹⁴ GOV/2024/61, November 19, 2024.

uranium stockpile in the form of UF6 was 5,807.2 kg (2,190.9 kg of uranium enriched up to 2% U-235; 2,594.8 kg of uranium enriched up to 5% U-235; 839.2 kg of uranium enriched up to 20% U-235; and 182.3 kg of uranium enriched up to 60% U-235).¹⁵ The total stockpile of enriched uranium has increased by approximately 2,117 kg since the IAEA report in November 2023.16 Iran has steadily increased its stockpile of uranium enriched up to 60%.¹⁷ In response to this situation, IAEA Director General, Rafael Mariano Grossi said, "[i]t is clear that the accumulation of enriched uranium at very high levels has been a matter of concern for many around the world."¹⁸

The same IAEA report also states, "During high level meetings between the Agency and Iran in Tehran on November 14, 2024, the possibility of Iran not further expanding its stockpile of uranium enriched up to 60% U-235 was discussed, including technical verification measures necessary for the Agency to confirm this, if implemented. On November 16, the Agency verified at FFEP and FEP that Iran had begun implementation of preparatory measures aimed at stopping the increase of its stockpile of uranium enriched up to 60% U-235. Exchanges between the Agency and Iran on this matter are expected to continue."¹⁹

In this discussion, Iran offered that it would suspend the expansion of its 60% enriched uranium stockpile unless the IAEA Board of Governors meeting in November adopted a resolution proposed by the Western countries demanding that Iran cooperate with the agency's investigation of evidence of undeclared nuclear activity. However, Western countries did not accept this, and the resolution was adopted.²⁰

Following the adoption of the resolution, Iran announced that it would begin operating new and advanced centrifuges.²¹ In addition, the president of AEOI stated that issuing a directive to operate a substantial number of centrifuges of various models.²² It is reported that the

¹⁵ Ibid. Iran has shut down its online enrichment monitors and other equipment, and the IAEA has provided estimates because it is unable to determine its real-time enriched uranium holdings.

¹⁶ GOV/2023/57, November 15, 2023.

¹⁷ Uranium with an enrichment level of 20% or more is considered to be highly enriched uranium (HEU). In general, uranium with an enrichment level of 90% or more is considered to be "weapons-grade" uranium, suitable for use in nuclear weapons.

¹⁸ "Director General Briefs Board on Iran Developments, Ukraine Support, Technical Assistance and More," IAEA, November 20, 2024, https://www.iaea.org/newscenter/news/director-general-briefs-board-on-iran-developments-ukraine-support-technical-assistance-and-more.

¹⁹ GOV/2024/61, November 19, 2024.

²⁰ "Iran Offers to Cap Sensitive Uranium Stock as IAEA Resolution Looms," *Renters*, November 20, 2024, https://www.reuters.com/world/middle-east/iran-offers-cap-sensitive-uranium-stock-avoid-iaea-resolution-2024-11-19/.

²¹ "Iran to Launch 'Advanced Centrifuges' in Response to IAEA Censure," *Jiji Press*, November 22, 2024, https://sp.m.jiji.com/english/show/36842.

²² "Joint Statement of the Ministry of Foreign Affairs and the Atomic Energy Organization of Iran Regarding the Unjust Resolution," Ministry of Foreign Affairs, Iran, November 22, 2024,

IAEA has informed Iran of the need to strengthen inspections of the FEEP in response to Iran's plans to install more than 6,000 additional centrifuges in the future.²³ On December 7, the IAEA Director General reported that Iran had resumed production of enriched uranium, and that its capacity to produce 60% enriched uranium was set to rise more than seven to eight times greater than the then current level of 5 to 7 kg per month.²⁴

In early December, the IAEA published a report on Iran's expansion of its uranium enrichment capabilities. It is reported that Iran has established an interconnected, three-steps enrichment process at the FFEP, which makes it possible to enrich natural uranium almost continuously up to 60%, and that the production rate of 60% Highly Enriched Uranium (HEU) at the facility can be increased four to six times. In addition, the process that previously used up to 5% LEU to produce 60% HEU has now started using 20% enriched uranium. These steps are supposed to increase the production of 60% HEU.²⁵

On the other hand, the same IAEA report also mentioned that, in response to the expansion of activities at FEEP, Iran and the IAEA have agreed to strengthen monitoring of the facility.²⁶

Other activities— The IAEA report of November also stated, "As of 23 October 2024, minor civil construction work was ongoing at the Khondab Heavy Water Research Reactor (KHRR). Although the commissioning of KHRR had been expected in 2023 using the IR-20 dummy fuel assemblies,12 during a design information verification (DIV) on 10 August 2024, Iran informed the Agency that commissioning was now expected to take place in 2025 and operation to start in 2026."²⁷ On the other hand, although it is not an obligation under the Comprehensive Safeguards Agreement, Iran has not declared the amount of stored heavy water or the amount produced at heavy water production plants (HWPP) as stipulated in the verification procedures agreed to by Iran and the IAEA under the JCPOA, and has not permitted the IAEA to monitor them.

https://en.mfa.gov.ir/portal/newsview/756954/Joint-Statement-of-the-Ministry-of-Foreign-Affairs-and-the-Atomic-Energy-Organization-of-Iran-Regarding-the-Unjust-Resolution.

²³ "Iran Plans New Uranium-Enrichment Expansion, IAEA Report Says," *Reuters*, November 29, 2024, https://www.reuters.com/world/middle-east/iran-plans-uranium-enrichment-expansion-natanz-fordow-iaea-report-says-2024-11-28/.

²⁴ "Exclusive: Iran Dramatically Accelerating Uranium Enrichment to Near Bomb Grade, IAEA Says," *Reuters*, December 7, 2024, https://www.reuters.com/world/middle-east/iran-dramatically-increasing-enrichment-near-bomb-grade-iaea-chief-2024-12-06/.

²⁵ David Albright and Sarah Burkhard, "IAEA's December 6th Update on Iran," Institute for Science and International Security, December 10, 2024, https://isis-online.org/isis-reports/detail/iaeas-december-6thupdate-on-iran.

²⁶ "Iran Accepts Tougher Oversight at Fordow Enrichment Plant, IAEA Reports," *Reuters*, December 12, 2024, https://www.reuters.com/world/middle-east/iran-accepts-tougher-oversight-fordow-enric hment-plant-iaea-reports-2024-12-12/.

²⁷ GOV/2024/61, November 19, 2024, pp. 4-5.

Breakout time—The uranium enrichment limits in the JCPOA were formulated to ensure that Iran's breakout time (the time required to produce weapons-grade fissile material for one nuclear weapon) would be no less than 12 months.

In July 2024, the U.S. Secretary of State Antony Blinken indicated that the breakout time had been shortened to one to two weeks.²⁸ Based on the IAEA November 2024 report, some U.S. experts contend (with no official confirmation) that Iran could also quickly produce additional weapons, assessing that:

Iran can use a fraction of its 60 percent enriched uranium to rush to its first quantity of 25 kg of WGU in a week or less. Its enriched uranium stocks are sufficient to make enough weapon-grade uranium for almost ten nuclear weapons in one month, 13 nuclear weapons in two months, 14 in three months, 15 in four months, and 16 in five months.²⁹

Efforts to restore the nuclear deal

Indirect negotiations aimed at restoring a nuclear deal with Iran have failed to reach an agreement. Although progress was reported from time to time, each time new difficulties emerged. As the armed conflict between Israel and Hamas—which began with a terrorist attack in Israel by Hamas in October 2023—expanded in 2024 to involve neighboring Middle Eastern countries including Iran, it became even more difficult to reach an agreement. Officials from France, Germany and the United Kingdom met with Iranian counterparts in November but could not find a way out of the nuclear impasse.³⁰

In January 2024, U.S. officials had reportedly held indirect negotiations with Iranian officials in Oman.³¹ In May, it was reported that Iran had presented a tentative proposal to the United States in late April, calling for a reduction in the level of uranium enrichment to 20% and a limited lifting of economic sanctions by the United States.³² In addition, the reformist Masoud Pezeshkian, who was inaugurated as Iranian President at the end of July, stated that he placed importance on dialogue with the West and aimed to rebuild the Iran nuclear agreement. At the end of August, Supreme Leader, Ayatollah Seyed Ali Khamenei, suggested to the government that there was "no harm" in

²⁸ "Blinken says Iran's Nuclear Weapon Breakout Time Is Probably Down to 1-2 Weeks," *CNN*, July 19, 2024, https://edition.cnn.com/2024/07/19/politics/blinken-nuclear-weapon-breakout-time/index.ht ml.

²⁹ David Albright, Sarah Burkhard and Spencer Faragasso, "Analysis of IAEA Iran Verification and Monitoring Report — November 2024," Institute for Science and International Security, November 21, 2024, p. 15, https://isis-online.org/isis-reports/detail/analysis-of-iaea-iran-verification-and-monitoringreport-november-2024.

³⁰ "Iran and Europe Seek to Break Nuclear Impasse before Return of Trump," *The Guardian*, November 29, 2024, https://www.theguardian.com/world/2024/nov/29/iran-in-nuclear-talks-with-europeans-as-trump-presidency-approaches.

³¹ "US Held Indirect Talks with Iranian Officials in Oman Earlier This Year Amid Tensions in Middle East," *CNN*, March 13, 2024, https://edition.cnn.com/2024/03/13/politics/us-iran-indirect-talks/index.html.

³² "Iran Offers to Reduce Uranium Enrichment, Presents Plan to Rebuild Nuclear Agreement to the U.S. Government," *Kyodo News Agency*, May 2, 2024, https://nordot.app/1158658235981905928. (in Japanese)

engaging with "the enemy," but at the same time he indicated red lines for negotiations and said that the United States could not be trusted.³³

In September, President Pezeshkian said that Iran would be open to hold direct negotiations with the United States if the United States could demonstrate that it did not view Iran as an enemy.³⁴ Prior to the UN General Assembly, Foreign Minister Abbas Araghchi indicated in a social media post that Iran was willing to resume talks if the other countries were ready.³⁵

In the meantime, Iran continued to criticize the United States. In a speech at the IAEA General Conference in September 2024, Iran's representative stated, "I would like to reiterate that Iran's JCPOA-related voluntary measures were implemented in exchange for the lifting of unjust and illegal sanctions. What is being pursued today through political pressure is forcing Iran to implement JCPOA measures without considering the sanctions-lifting commitments of the other sides." He also asserted that Iran had suspended the JCPOA measures that go beyond its comprehensive safeguards agreement due to the unilateral withdrawal of the United States from the JCPOA and the non-compliance of European parties.³⁶

On the other hand, in August, a spokesperson for the U.S. State Department said, "We will judge Iran's leadership by their actions, not their words. [...] If Iran wants to demonstrate seriousness or a new approach, they should stop nuclear escalations and start meaningfully cooperating with the IAEA," and indicating that the possibility of an early resumption of negotiations was not high.³⁷ Coupled with the U.S. presidential election in November and the rising tension between Iran and Israel, there was no prospect of a resumption of (even indirect) negotiations after the fall of 2024.

Withdrawal from the NPT

While Article X-1 of the NPT provides some guidelines on how a state party can legitimately withdraw from the treaty, there remains a lack of clarity over certain

³³ Jon Gambrell, "Iran's Supreme Leader Opens Door to Negotiations with US over Tehran's Nuclear Program," *AP*, August 28, 2024, https://www.apnews.com/article/iran-nuclear-deal-khamenei-us-tensions-bc11763f45041ac84171ebc3866f1273%20.

³⁴ "Iran's President Says Direct Talks with U.S. Possible If It Abandons Its Hostility," *Reuters*, September 16, 2024, https://www.reuters.com/world/middle-east/irans-president-says-direct-talks-with-us-possible -if-it-abandons-its-hostility-2024-09-16/.

³⁵ "Iran Ready to Resume Nuclear Negotiations Immediately: Foreign Minister," *Aljazeera*, September 23, 2024, https://www.aljazeera.com/news/2024/9/23/iran-ready-to-resume-nuclear-negotiations-immedi ately-foreign-minister.

³⁶ "Statement by His Excellency Mr. Mohammad Eslami, Vice-President of the Islamic Republic of Iran and President of the Atomic Energy Organization of Iran at the Sixty-Eight General Conference of the IAEA," September 16, 2024, https://www.iaea.org/sites/default/files/24/09/iran-gc68.pdf.

³⁷ "Biden Administration Throws Cold Water on Prospect of Renewed Iran Nuclear Talks," *ABC News*, August 28, 2024, https://abcnews.go.com/Politics/biden-administration-cold-water-prospect-renewed-iran-nuclear-talks/story?id=113189046%20.

aspects of this process. In light of North Korea's declaration to withdraw from the NPT, Japan, South Korea and several other Western countries have proposed stricter requirements for withdrawal from the treaty. At the 10th NPT Review Conference (RevCon) in 2022, the Nonproliferation and Disarmament Initiative (NPDI) argued for the need to "[r]eaffirm that the procedures in article X must be fully and strictly followed by any State party that makes the decision to withdraw from the Treaty. The Treaty provides for the requirements to exercise the right of withdrawal, which means that any notice of withdrawal without completing these requirements is not valid." It proposed principles and requirements for withdrawal.³⁸ At the NPT PrepCom in 2024, the Vienna Group of Ten also made a proposal similar to the NPDI.³⁹ The United States also stated the following as basic principles on withdrawal: withdrawal from the NPT by definition sets back the goal of universality; it must be recognized that a withdrawing state remains responsible under international law for any unresolved noncompliance prior to withdrawal; and, a State Party's withdrawal in no way minimizes its obligations regarding the use or misuse the fruits of

peaceful nuclear cooperation.40

On the other hand, the Chinese and Russian positions on this issue seem more cautious than the above-mentioned countries. Furthermore, Non-Aligned Movement (NAM) countries along with Brazil have been critical of the tightening of withdrawal requirements, arguing that withdrawal from the treaty is a right of the states parties.

Iran's Deputy Foreign Minister Kazem Gharibabadi stated in regard to the JCPOA, "If the snapback mechanism⁴¹ is triggered, Iran will withdraw from the NPT," and added that this decision had already been conveyed to the European side during the administration of Ebrahim Raisi.⁴²

<u>Alleged interest in acquiring nuclear</u> weapons

In the wake of rapid advancements in North Korea's nuclear and missile programs, accompanied by increasingly aggressive nuclear posturing, South Korea has at times shown indications of interest in acquiring nuclear weapons in order to counter the escalating threats from its northern neighbor.⁴³

³⁸ NPT/CONF.2020/WP.58, June 3, 2022.

³⁹ NPT/CONF.2026/PC. II/WP.11, May 28, 2024.

⁴⁰ "Statement to Cluster 2 of the 2024 NPT PrepCom," U.S. Department of States, July 26, 2024, https://www.state.gov/statement-to-cluster-2-of-the-2024-npt-prepcom/.

⁴¹ If Iran violates the JCPOA, the JCPOA participating countries will report this to the UN Security Council, and if no country objects, sanctions based on past U.N. Security Council resolutions will be reinstated. S/RES/2231 (2015), July 20, 2015, para. 11-13.

⁴² "Europe Forcing Iran out of NPT," *Tehran Times*, November 23, 2024, https://tehrantimes.com /news/506656/Europe-forcing-Iran-out-of-NPT.

⁴³ For example, see follows, "North Korea Neighbor Calls for Nuclear Weapons," *Newsweek*, July 8, 2024, https://www.newsweek.com/south-korean-politician-calls-nuclear-weapons-1922204; "After a Lull,

In January 2023, President Yoon Suk Yeol mentioned the possibility of South Korea possessing its own nuclear weapons if the North Korean nuclear issue became more serious, but this was later denied by the presidential office.⁴⁴ Later, the Washington Declaration, which was announced after the U.S.-South Korea Summit Meeting in April 2023, emphasized South Korea's commitment to its obligations under the NPT.⁴⁵

Underscoring this position, in an interview in February 2024, President Yoon dismissed calls for South Korean nuclear armament but also referred to South Korea's technological capability. He stated, "If we were to develop nuclear weapons now, we would probably be subject to various economic sanctions [...] That's why we should strictly comply with the terms of the Non-Proliferation Treaty. But considering the country's science and technology capabilities, it would not take long to develop nuclear weapons if the country put its mind to it."⁴⁶

In August 2024, Kim Yong-hyun, who

had been appointed as the Minister of Defense, said in an interview that "responding to North Korean nuclear threats based on extended deterrence and the nuclear umbrella is the standard." But he also argued, "[W]hen looking at the people's safety as the top priority, and if that is determined to be not enough to handle North Korea's nuclear threats, all means and methods are open."⁴⁷

Other developments in South Korea included a public opinion poll that reported that 66% of the population were in favor of possessing nuclear weapons.⁴⁸ This was consistent with polls in previous years.

Since the mid-2010s, there have been repeated statements from Saudi Arabia suggesting an interest in acquiring nuclear weapons. For example in September 2023, Crown Prince Muhammad bin Salman said in an interview, "If [Iran] gets one, we have to get one [...] for security reasons, and for balancing power in the Middle East, but we don't want to see that."⁴⁹ No similar statements were

South Korea is Suddenly Talking about Going Nuclear Again," NK news, July 5, 2024, https://www.nknews.org/2024/07/after-a-lull-south-korea-is-suddenly-talking-about-going-nuclear-again/.

⁴⁴ *Hiroshima* Report 2024, p. 112.

⁴⁵ "Washington Declaration," The White House, April 26, 2024, https://www.whitehouse.gov/briefing-room/statements-releases/2023/04/26/washington-declaration-2/.

⁴⁶ "Yoon Addresses N. Korea, Low Birthrate & First Lady's Dior Bag," *KBS World*, February 8, 2024, https://world.kbs.co.kr/service/news_view.htm?lang=e&Seq_Code=183602.

⁴⁷ "Defense Minister Nominee Says Open to All Means to Respond to N.K. Threats," *Yonhap News Agency*, August 16, 2024, https://en.yna.co.kr/view/AEN20240816002300315.

⁴⁸ "KINU's Announcement of the Result of the 2024 KINU Unification Survey: North Korea's Two-State Claim / US Presidential Election Outlook and ROK-US Relations," Korea Institute for National Unification, June 27, 2024, https://www.kinu.or.kr/eng/board/view.do?nav_code=eng1678858138& code=78h7R6ucKsuM&idx=24481.

⁴⁹ For example, see, Sarah Fortinsky, "Saudi Crown Prince on Iran Acquiring Nuclear Weapons: 'If They Get One, We Have to Get One," *The Hill*, September 20, 2023, https://thehill.com/policy/international /4215594-saudi-crown-prince-on-iran-acquiring-nuclear-weapon s-if-they-get-one-we-have-to-get-one/.

reported in 2024. Perhaps relatedly in 2023, it was reported that Saudi Arabia, in the context of constructing nuclear power plants, was considering proposals from China, which does not impose restrictions on enrichment and reprocessing activities. Moreover, Saudi Arabia was reportedly exploring the possibility of acquiring uranium enrichment technology from China.⁵⁰

Negotiations between the United States and Saudi Arabia over a nuclear cooperation agreement that would allow access to the U.S. nuclear energy technology have been stalled for several years over the U.S. insistence on conditions that would prohibit acquisition of uranium enrichment and plutonium reprocessing capabilities. Crown Prince Muhammad and U.S. National Security Advisor Jake Sullivan held talks in May 2024 to discuss what was called a near final draft of strategic agreement.⁵¹ It was unclear how close they came to finalizing a nuclear cooperation agreement.

Regarding Iran, there was increasingly

public discussion of a nuclear weapons option.⁵² For example, the commander of the Islamic Revolutionary Guard Corps said in April 2024, "The threats of the Zionist regime (Israel) against Iran's nuclear facilities make it possible to review our nuclear doctrine and deviate from our previous considerations," amid growing concerns about the possibility of armed conflict with Israel.⁵³ In May, the Strategic Council on Foreign Relations, an advisory body to Iran's Supreme Leader Ayatollah Ali Khamenei, released an interview with its chairman Seyed Kamal Kharrazi in which he suggested that Iran would consider the option of going nuclear if Israel attacked Iran's nuclear facilities or threatened its existence.54

On the other hands, Nasser Kanaani, a spokesperson of the ministry of foreign affairs stated that, "Iran has repeatedly said its nuclear program only serves peaceful purposes. Nuclear weapons have no place in our nuclear doctrine."⁵⁵ Foreign Minister Araghchi also posted on social media that "Iran is NOT after

⁵⁰ "Saudi Arabia Considers Chinese Bid for Nuclear Plant, Wall Street Journal Reports," *Reuters*, August 25, 2024, https://www.reuters.com/business/energy/saudi-arabia-eyes-chinese-bid-nuclear-plant-wsj-2023-08-25/.

⁵¹ "HRH the Crown Prince Receives U.S. National Security Advisor," *Saudi Press Agency*, May 19, 2024, https://www.spa.gov.sa/en/N2105228.

⁵² Javad Heiran-Nia, "Iranians Debate Whether It's Time to Develop Nuclear Weapons," The Stimson Center, November 8, 2024, https://www.stimson.org/2024/iranians-debate-whether-its-time-to-develop-nuclear-weapons/.

⁵³ "Iranian Commander Says Tehran Could Review 'Nuclear Doctrine' Amid Israeli Threats," *Reuters*, April 18, 2024, https://www.reuters.com/world/middle-east/iranian-commander-warns-tehran-could-review-its-nuclear-doctrine-amid-israeli-2024-04-18/.

⁵⁴ "Iran Warns it Will Change Nuclear Doctrine if 'Existence Threatened,'" *Aljazeera*, May 9, 2024, https://www.aljazeera.com/news/2024/5/9/iran-warns-it-will-change-nuclear-doctrine-if-existence-thre atened.

⁵⁵ "Iran Says Nuclear Weapons Have no Place in its Nuclear Doctrine," *Reuters*, April 22, 2024, https://www.reuters.com/world/middle-east/iran-says-nuclear-weapons-have-no-place-its-nuclear-doctr ine-2024-04-22/.

nuclear weapons, period. This is a policy based on Islamic teachings and our security calculations."⁵⁶

CIA Director William Burns said in October that Iran was approaching the potential to produce nuclear weapons, but added, "We do not see evidence today that the supreme leader has reversed the decision that he took at the end of 2003 to suspend the weaponization program."⁵⁷ On the other hand, the report submitted to Congress in July 2024 by the Director of National Intelligence⁵⁸ omitted a sentence about Iran: "not currently undertaking the key nuclear weapons development activities that would be necessary to produce a testable nuclear device," which had been mentioned in the previous year's report.⁵⁹

At a press conference following the EU Council Summit on October 17, 2024, Ukrainian President Volodymyr Zelenskyy disclosed that during his meeting with former U.S. President Trump the previous month, Zelenskyy had said, "Either Ukraine will have nuclear weapons, and

then this is defence for us, or we should have some kind of an alliance." At the same press conference, he also explained the reason for including NATO membership in Ukraine's "Victory Plan," which was announced in the same month, by saying, "NATO countries are not at war. People are all alive in NATO countries. And thank God. That is why we choose NATO. Not nuclear weapons." At the joint press conference with NATO that was held after the EU press conference, he also said, "We are not building nuclear weapons. What I meant is that today there is no stronger security guarantee for us besides NATO membership."60

In response to President Zelensky's comments, Russian President Vladimir Putin condemned the statement, saying, "Such a threat will provoke an appropriate reaction from Russia. Russia will not allow this under any circumstances."⁶¹

The day after Zelensky's comments, Andriy Yermak, the head of the presidential administration, said that

⁵⁶ "Araghchi: Iran is NOT after Nuclear Weapons Period," Islamic Republic of Iran, Ministry of Foreign Affairs, November 9, 2024, https://en.mfa.ir/portal/newsview/756318/Araghchi-Iran-is-NOT-after-nuclear-weapons-period.

⁵⁷ "There is No Evidence Iran has Decided to Rush Toward Building a Nuclear Weapon, CIA Director Says," *NBC News*, October. 8, 2024, https://www.nbcnews.com/investigations/no-evidence-iran-rushing-build-nuclear-weapon-cia-director-says-rcna174004.

⁵⁸ "Iran's Nuclear Weapons Capability and Terrorism Monitoring Act of 2022," July 2024, https://www.dni.gov/files/ODNI/documents/assessments/ODNI-Unclassified-Irans-Nuclear-Weapon s-Capability-and-Terrorism-Monitoring-Act-of-2022-202407.pdf.

⁵⁹ "Iran Is Better Positioned to Launch Nuclear-Weapons Program, New U.S. Intelligence Assessment Says," *The Wall Street Journal*, August 9, 2024, https://www.wsj.com/world/middle-east/iran-is-better-positioned-to-launch-nuclear-weapons-program-new-u-s-intelligence-assessment-says-e39b6c78.

⁶⁰ "Zelenskyy: We Need NATO or Nukes ... and We Want NATO," *Politico*, October 17, 2024, https://www.politico.eu/article/nato-nukes-volodymyr-zelenskyy-war-ukraine-aid-russia/.

⁶¹ "Putin Concerned by Rumors of Ukraine's Ability to Restore Nuclear Arsenal," *RBC-Ukraine*, October 18, 2024, https://newsukraine.rbc.ua/news/putin-soncerned-by-rumors-of-ukraine-s-ability-1729277074. html.
Ukraine had no intention of acquiring nuclear weapons.⁶²

C) Nuclear-Weapon-Free Zones

Treaties establishing nuclear-weapon-free zones (NWFZs) have entered into force in Latin America (Tlatelolco Treaty), the South Pacific (Rarotonga Treaty), Southeast Asia (Bangkok Treaty), Africa (Pelindaba Treaty) and Central Asia (Central Asian NWFZ Treaty). In addition, Mongolia declared its territory a nuclear-weapon-free zone at the UNGA in 1992, and the UNGA has been adopting a resolution entitled "Mongolia's International Security and Nuclear-Weapon Free-Status" every two years since 1998, in support of Mongolia's declaration.⁶³

As a recent development in strengthening the efforts of existing NWFZs, Kazakhstan co-hosted a meeting with the UN Office for Disarmament Affairs on August 27, 2024, entitled "Promoting Cooperation and Strengthening Consultations: Mechanisms among Existing NWFZs." Kazakhstan invited the parties to the NWFZ treaties and their secretariats, and reported that discussions were held to deepen cooperation among NWFZs and to promote exchanges with the UN disarmament platform.⁶⁴ In opening remarks, Deputy Foreign Minister of Kazakhstan Akan Rakhmetullin mentioned the possible creation of an information-sharing mechanism.⁶⁵ As part of this initiative, a webpage for sharing information related to NWFZs was set up on the UN website.⁶⁶

At the 2024 NPT PrepCom, a working paper on a NWFZ treaty submitted by the NAM countries called on Israel to participate in the Conference on Establishment of a Middle East Region Free of Nuclear Weapons and Other Weapons of Mass Destruction (WMD) (hereafter, the "Middle East Conference"). and to engage constructively. The working paper also called on nuclear-weapon States that had not yet participated to join the conference.⁶⁷ In their national statements, the NAM countries also reiterated their serious concern about the delay in implementing the 1995 resolution on the Middle East,⁶⁸ and urged the co-sponsors of the resolution to take all necessary measures to fully implement the

⁶² "Ukraine Not Considering Nuclear Arms, Top Official Yermak Says," *Reuters*, October 19, 2024, https://www.reuters.com/world/europe/ukraine-not-considering-nuclear-arms-top-official-yermak-says-2024-10-18.

⁶³ A/RES/53/77D, December 4, 1998.

⁶⁴ "On the Conference on Strengthening Cooperation between Nuclear-Weapon-Free Zones," Ministry of Foreign Affairs of the Republic of Kazakhstan, August 28, 2024, https://www.gov.kz/memleket/entities/mfa/press/news/details/835015?lang=en.

⁶⁵ "Kazakhstan Hosts Workshop to Strengthen Cooperation between Nuclear-Free Zones," *The Astana Times*, August 28, 2024, https://astanatimes.com/2024/08/kazakhstan-hosts-workshop-to-strengthen-cooperation-between-nuclear-free-zones/.

⁶⁶ "About," United Nations, https://www.un.org/nwfz/fr/content/about-website.

⁶⁷ NPT/CONF.2026/PC. II/WP.24, p. 2.

⁶⁸ NPT/CONF.1995/32, 1995.

resolution without further delay.69

Iran called on all NPT States Parties to prohibit nuclear cooperation with the Israeli regime, arguing that Israel's nuclear weapons pose the most serious threat to regional security.⁷⁰ Regarding the 1995 Middle East Resolution, Iran stated that "achieving the objectives of the 1995 resolution on the Middle East is the responsibility of all States Parties, especially the nuclear-weapon States and the three depositary States of the Treaty that co-sponsored the 1995 resolution. Progress towards establishing a nuclearweapon-free zone in the Middle East is an urgent necessity."⁷¹

Russia said, "We once again call on the United States, who co-sponsored the 1995 resolution, and Israel not to disregard the Conference, but rather take this opportunity to contribute their vision and engage in an open discussion on strengthening security in the Middle East."⁷²

The United States mentioned that it would continue to be committed to achieving the goal of a Middle East WMD-free zone. At the same time, it stated to countries that criticized Israel, "I invite some introspection as to whether unbalanced, ad hominem attacks, pressure, or invocation of extreme language [...] will bring the region one step closer to the goal of achieving a Middle East WMDfree zone based on arrangements freely arrived at by the states concerned."⁷³

Israel stated the following in its explanation of the vote in the First Committee of the UN General Assembly on the resolution to establish a nuclearweapon-free zone in the Middle East.⁷⁴

By imposing a new unilateral and unconstructive resolution in 2018, the Arab group embarked on a process which has altered the status quo and forced Israel to disassociate itself with the draft resolution. [...] Any framework of regional security can only be the outcome of a mutual political desire of all regional parties to engage with each other, taking into consideration the security concerns of each and every state and reflecting arrangements freely arrived at by all states concerned, as stipulated in the 1999 Disarmament Commission Report on Guidelines and Principles for the nuclear weapon Free Zone.

The fifth Middle East Conference was held on November 18-22, 2024, in which

⁶⁹ "Statement by Group of the Non-Aligned States Parties," Cluster 2, Regional Issues, Second PrepCom for the 11th NPT RevCon, July 29, 2024.

⁷⁰ "Statement by Iran," Cluster 2 Nuclear Non-Proliferation, Second PrepCom for the 11th NPT RevCon, July 26, 2024.

⁷¹ Ibid.

⁷² "Statement by Russia," Cluster 2 Nuclear Non-Proliferation, Second PrepCom for the 11th NPT RevCon, July 26, 2024.

⁷³ "Statement of the United States," Cluster 2 Specific Issue, Second PrepCom for the 11th NPT RevCon July 29, 2024.

⁷⁴ "Statement by Mrs. Michal Maayan, Director of Arms Control Department, MFA," First Committee 79th General Assembly, November 1, 2024.

22 regional countries and four observers (China, France, Russia and the United Kingdom) participated. According to its conference report, the general discussion covered diverse issues, including the importance of implementing the Middle East Resolution issued by the 1995 NPT Review and Extension Conference, general principles and core obligations, the inalienable right of states parties to receive and use nuclear, chemical and biological technology and materials solely for peaceful purposes, commitment to achieving a WMD free world, peaceful uses and technical cooperation. The participating countries also urged Israel to promptly join the NPT and implement IAEA comprehensive safeguards.

In the final report of the previous Middle East Conference, there was a passage that emphasized the need for Israel to participate in the Middle East Conference, but such a passage was not found in the report of the 5th Middle East Conference.⁷⁵ Instead, the following statement from the participating countries was included: "[B]y politicizing the initiative of establishing a Middle East free of WMDs and refusing to participate in the Conference, Israel seeks to conceal the true reason behind its opposition to the establishment of a Middle East zone free of WMD which is to retain its own WMD programmes by remaining free of any legally binding commitments."⁷⁶

Thematic debates covered (a) Reflection and thoughts on previous and future sessions of the Conference and its working committee, and (b) Continuation of the discussion on the topics from the fourth session and its working committee, namely nuclear verification and peaceful uses and technical cooperation.

In the theme (a), member countries to the Conference acknowledged the progress and achievements made by the Conference and its working committee both procedurally and substantively, and expressed their commitment to further deepening and enriching the discussions. They also identified as a key challenge the continued absence of Israel from the sessions, and noted with regret that the United States was the only invited observer statute that had not yet attended. It was then requested that future Chairs encourage the UN Secretary-General to support the participation of member and observer states which have not attended. In theme (b), member countries discussed about their views on IAEA safeguards and the inalienable right to peaceful uses of nuclear, chemicals, and biological materials.77

At past UNGAs from 1980 through 2017, a resolution titled "Establishment of a nuclear-weapon-free zone in the region of the Middle East"⁷⁸ was adopted without a vote. However, the resolution in 2024, as in the previous years, was taken to a vote:

⁷⁵ Hiroshima Report 2024, p. 115.

⁷⁶ A/CONF.236/2024/3, November 22, 2024, p. 5.

⁷⁷ A/CONF.236/2024/3, November 22, 2024, pp. 5-9.

⁷⁸ A/RES/79/16, December 2, 2024.

176 countries were in favor, Israel was against, and the United State and two other countries abstained.⁷⁹

Concerning Northeast Asia and South Asia, while initiatives for establishing NWFZs have been proposed by nongovernmental groups in the respective regions, there are few signs that states parties in these regions are taking any serious initiative toward this goal. One exception is Mongolia, which in its report submitted to the NPT RevCon expressed a willingness to "[p]lay an active role in promoting the idea of establishing a nuclear weapon-free zone in north-east Asia."80 At the 2024 NPT PrepCom, Kazakhstan mentioned Northeast Asia region in context of its support for expansion of NWFZ.81

(2) IAEA Safeguards Applied to the NPT NNWS

A) Conclusion of IAEA Safeguards Agreements

To prevent and detect the diversion of nuclear materials from peaceful purposes to nuclear weapons and other nuclear explosive devices, Article III-1 of the NPT obliges non-nuclear weapon States (NNWS) to conclude and implement a comprehensive safeguards agreement (CSA) with the IAEA and to accept its safeguards. As of December 2024, three NPT NNWS have yet to conclude CSAs with the IAEA.⁸²

In accordance with the strengthened safeguards system in place since 1997, an NPT NNWS or any other state may also conclude with the IAEA an Additional Protocol to its safeguards agreement, based on a model document known as INFCIRC/540. As of October 2024, 143 NPT NNWS have ratified Additional Protocols. Iran started the provisional implementation of the Additional Protocol in January 2016, but terminated its application in February 2021 in response to the U.S. withdrawal from the JCPOA.

A state's faithful implementation of the Additional Protocol, along with the CSA, allows the IAEA Secretariat to draw a socalled "broader conclusion" that "all nuclear material in the State has remained in peaceful activities." This conclusion states that the Agency finds no indication of diversion of declared nuclear material from peaceful nuclear activities, misuse of the facilities for purposes other than those for which it was declared, or the presence of any undeclared nuclear material or

⁷⁹ "Establishment of a Nuclear-Weapon-Free Zone in the Region of the Middle East: Resolution / Adopted by the General Assembly," United Nations Digital Library, December 2, 2024, https://digitallibrary.un.org/record/4068510.

⁸⁰ NPT/CONF.2020/18, March 20, 2020.

⁸¹ "Statement by Kazakhstan," General Statement, Second PrepCom for the 11th NPT RevCon, July 23, 2024.

⁸² IAEA, "Status List: Conclusion of Safeguards Agreements, Additional Protocols and Small Quantities Protocols," December 31, 2024, https://www.iaea.org/sites/default/files/20/01/sg-agreements-comprehensive-status.pdf. All of these three countries (Equatorial Guinea, Guinea and Somalia) possess a small amount of nuclear material or do not conduct activities for peaceful use of nuclear energy.

				(As of December 2023)
	CSA (Year)*	Additional Protocol (Year) *	Broader conclusion drawn	Integrated safeguards
Australia	1974	1997	0	0
Austria	1996	2004	0	0
Brazil	1994			
Canada	1972	2000	0	0
Egypt	1982			
Germany	1977	2004	0	0
Indonesia	1980	1999	0	0
Iran	1974	Signed**		
Japan	1977	1999	0	0
Kazakhstan	1995	2007	0	0
South Korea	1975	2004	0	0
Mexico	1973	2011		
Netherlands	1977	2004	0	0
New Zealand	1972	1998	0	0
Norway	1972	2000	0	0
Poland	2007	2007	0	0
Saudi Arabia	2009			
South Africa	1991	2002	0	0
Sweden	1995	2004	0	0
Switzerland	1978	2005	0	0
Syria	1992			
Turkey	1981	2001	0	
North Korea***	1992			

Table 2-1: The status of the conclusion and implementation of the IAEA safeguards agreement by the NNWS party to the NPT

* (Year) shows when the CSA or Additional Protocol entered into force.

**Tran has accepted provisional application of the Additional Protocol. Iran signed the Additional Protocol in 2003 and accepted its provisional application under the JCPOA adopted in 2015. However, it terminated the application in February 2021.

*** North Korea has refused to accept monitoring and verification by the IAEA, including comprehensive safeguards, since announcing its withdrawal from the NPT in 1993.

Source: IAEA, "Safeguards Statement for 2023."

activities in that country. (At the end of 2023, such a conclusion was drawn for 71 countries.) Subsequently, the IAEA implements so-called "integrated safeguards," a term defined as the "optimized combination of all safeguards measures available to the Agency under [CSAs] and [Additional Protocols], to maximize effectiveness and efficiency within available resources." According to the IAEA's "Safeguards Statement for 2023," published in 2024 and describing the situation in 2023, as of the end of 2022, 70 NNWS have applied integrated

safeguards.83

The current status of signature and ratification of the CSAs and the Additional Protocols and implementation of integrated safeguards by the NPT NNWS studied in this project is presented in ta 2-1. In addition to the IAEA safeguards, EU countries accept safeguards conducted by EURATOM, and Argentina and Brazil conduct mutual inspections under the bilateral Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC).⁸⁴

⁸³ IAEA, "Safeguards Statement for 2023," 2024.

⁸⁴ The ABACC stated at the NPT PrepCom, "Throughout these 32 years, ABACC has carried out more

In the resolution, titled "Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards" adopted in September 2024, the IAEA General Conference called on all States with unmodified Small Quantity Protocols (SQPs) to either rescind or amend them, and stated that the amended SQPs for 81 countries have entered into force as of September 2024.⁸⁵ Meanwhile, among countries that have expressed their intentions to introduce nuclear energy, Saudi Arabia had not yet accepted an amended SQP.⁸⁶ At the IAEA General Conference in September 2024, Director General Grossi stated, "Saudi Arabia has informed the Agency of its decision to rescind the original SQP. An agreement by exchange of letters to rescind the original SQP was reached with Saudi Arabia, which will enter into force on 31 December this year."87 Abdulaziz bin Salman, the energy minister of Saudi Arabia also said that "the Kingdom has completed the essential administrative preparations related to nuclear regulatory

framework and the requirements for implementing the Comprehensive Safeguards Agreement and has submitted a request to the Agency in July of 2024 to rescind the Small Quantities Protocol and implement the full Comprehensive Safeguards Agreement. We are currently working with the Agency to finalize all necessary subsidiary arrangements for the Small Quantities Protocol to be effectively rescinded by the end of December of this year (2024)."⁸⁸

B) Compliance with IAEA Safeguards Agreements

According to the "Safeguards Statement for 2023" published in 2024, as of the end of 2023, of the 134 countries to which both CSAs and the Additional Protocols are applied (not including Iran, which suspended provisional application of the Additional Protocol in 2021), the IAEA concluded that all nuclear materials remained in peaceful activities for 74 countries. For the remaining 62 countries, evaluations regarding the absence of

than 3,500 inspections at nuclear facilities in both countries, including more than 300 unannounced inspections. I would like to emphasize that despite all restrictions caused by the pandemic of COVID-19, ABACC was able to comply with its Annual Verification Plan, and performed 134 inspections in 2020 and 122 inspections in 2021." "Statement of the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC)," First PrepCom for the 11th NPT RevCon, July 31, 2023.

⁸⁵ GC (68)/RES/12, September 19, 2024.

⁸⁶ Saudi Arabia is on the verge of completing its first research reactor. Prior to importing nuclear fuel, the country needs to renegotiate its safeguards agreement. This involves transitioning from the safeguards activities stipulated under the SQP to those required by a comprehensive safeguards agreement. Additionally, it is essential for Saudi Arabia to enter into a subsidiary arrangement with the IAEA to ensure all nuclear materials and activities are adequately safeguarded. The current SQP in Saudi Arabia does not permit verification during the reactor design and construction stage, known as Design Information Verification (DIV). Such verification is mandatory for new research reactors, like the one Saudi Arabia is currently developing.

⁸⁷ IAEA, "Director General's Statement to the 68th IAEA General Conference," September 6, 2024, https://www.iaea.org/newscenter/statements/director-generals-statement-to-the-68th-iaea-general-conf erence.

⁸⁸ "Statement by Saudi Arabia," 68th IAEA General Conference, September 16-20, 2024.

undeclared nuclear material and activities for each of these states remained ongoing, and the IAEA concluded only that declared nuclear material remained in peaceful activities. For 45 countries with a CSA but with no Additional Protocol in force, the Agency concluded only that declared nuclear material remained in peaceful activities.⁸⁹

North Korea

In an annual report titled the "Application of Safeguards in the Democratic People's Republic of Korea" in August 2024, the IAEA Director-General reported: "Since 1994, the Agency has not been able to conduct all necessary safeguards activities provided for in the NPT Safeguards Agreement and since April 2009, Agency inspectors have not been present in the DPRK."⁹⁰ The IAEA also reported on the state of play of North Korea's nuclearrelated facilities from August 2023 to August 2024 via an analysis of public information and satellite images, for instance:

- Uranium mining and concentration: there were indications of ongoing mining, milling and concentration activities at the Pyongsan Uranium Mine and the Pyongsan Uranium Concentrate Plant, consistent with activities observed by the IAEA during previous years.
- Uranium enrichment facility in Yongbyon: the IAEA observed indications that the reported centrifuge enrichment facility at Yongbyon,

including the annex constructed between September 2021 and May 2022, continued to operate.

- Kangson complex: as previously reported, a complex of buildings within a security perimeter at Kangson, in the vicinity of Pyongyang, shares infrastructure characteristics with the reported centrifuge enrichment facility at Yongbyon. During the reporting period, there were indications of ongoing activities at this complex.
- 5MW graphite reactor: indications of the operation of the 5MW(e) Experimental Nuclear Power Plant, including the discharge of cooling water, continued to be observed. On eleven occasions, the IAEA observed short periods of shutdown, each of only a few days duration. A longer shutdown period, lasting up to 26 days, was observed during late-September to early-October 2023. These shutdown periods are consistent with observations of past reactor operating cycles.
- Other graphite reactors: construction of the 50MW(e) Nuclear Power Plant at Yongbyon and the 200MW(e) Nuclear Power Plant at Taechon was halted during the 1994 Agreed Framework and has since not been restarted.
- Light Water Reactor (LWR) under construction: from mid-October 2023 until mid-March 2024, the IAEA observed an almost continuous strong water outflow from the LWR's tertiary cooling water system. During a period of cold weather in mid-December

⁸⁹ IAEA, "Safeguards Statement for 2023."

⁹⁰ GOV/2024/42-GC(68)/15, August 26, 2024.

2023, ice melt in the river and steam from the water outflow was observed, indicating that warm water was being discharged and that the LWR had reached criticality. From mid-March 2024, the LWR was shut down for approximately 30 days, and since mid-April 2024, it has operated intermittently. These observations are consistent with the start of a commissioning process in October 2023, which has continued through the end of the reporting period.

Radiochemical Laboratory (reprocessing): the steam plant that serves the Radiochemical Laboratory operated intermittently from late-June 2023 to the end of the previous reporting period in mid-August 2023. During this reporting period, operation of the steam plant continued until late-August 2023, but no further operation has been observed since then. The operation of the steam plant during 2023 is consistent with waste treatment or maintenance activity at the Radiochemical Laboratory.

As in the previous report, the IAEA stated, "Once a political agreement has been reached among the countries concerned, the Agency is ready to return promptly to the DPRK, if requested to do so by the DPRK and subject to approval by the Board of Governors. The DPRK Team within the Department of Safeguards continues to undertake activities to maintain the Agency's enhanced readiness to play its essential role in verifying the DPRK's nuclear programme."91

<u>Iran</u>

Verification and monitoring

In accordance with a domestic law enacted in December 2020, Iran in February 2021 stopped implementing the verification measures in the JCPOA that went beyond the requirements of Iran's full-scope safeguards agreement with the IAEA. The IAEA Director-General reported in November 2024 that the following verification and monitoring activities have not been implemented since February 23, 2021:⁹²

- Monitoring or verifying Iranian production and stocks of heavy water;
- Verifying that use of shielded cells at two locations, referred to in the decision of the Joint Commission of January 14, 2016 (INFCIRC/907), are being operated as approved by the Joint Commission;
- Implementing continuous monitoring to verify that all centrifuges and associated infrastructure in storage remain in storage or have been used to replace failed or damaged centrifuges;
- Performing daily access upon request to the enrichment facilities at Natanz and Fordow, including to monitor Iran's production of stable isotopes;
- Verifying in-process low enriched nuclear material at enrichment facilities as part of the total enriched uranium

 $^{^{91}}$ Ibid. No specific measures were listed in this year's report, but several cases were listed in the 2023 report; see GOV/2023/41-GC (67)/20, August 25, 2023.

⁹² GOV/2024/61, November 19, 2024.

stockpile;

- Verifying whether or not Iran has conducted mechanical testing of centrifuges as specified in the JCPOA;
- \geq Monitoring or verifying Iranian production and inventory of centrifuge rotor tubes, bellows or assembled rotors; verifying whether produced rotor tubes and bellows are consistent with the centrifuge designs described in the JCPOA; verify whether produced rotor tubes and bellows have been used to manufacture centrifuges for the activities specified in the JCPOA; verifying whether rotor tubes and bellows have been manufactured using carbon fiber which meets the specifications agreed under the JCPOA;
- Monitoring or verifying the uranium ore concentrate (UOC) produced in Iran or obtained from any other source; and whether such UOC has been transferred to UCF;
- Verifying Iran's other JCPOA nuclearrelated commitments, including those set out in Sections D, E, S and T of Annex I of the JCPOA.

Iran has also continued to refuse, inter alia: implementation of the modified Code 3.1 of the Subsidiary Arrangements to Iran's Safeguards Agreement; provisional application of the Additional Protocol; and access to the data from its on-line enrichment monitors and electronic seals, or access to the measurement recordings registered by its installed measurement devices. The IAEA report in November also pointed out as following: "The situation was exacerbated in June 2022 by Iran's decision to remove all of the Agency's JCPOA-related surveillance and monitoring equipment. As a result of not having been able to perform JCPOA-related verification and monitoring activities for more than three and a half years, the Agency has lost continuity of knowledge in relation to the production and current inventory of centrifuges, rotors and bellows, heavy water and UOC, which it will not be possible to restore."⁹³

There were also challenges regarding the IAEA's verification capabilities. In September 2023, Iran informed its decision to withdraw the designation of several experienced IAEA inspectors assigned to conduct verification activities in Iran. The IAEA Director General's reports of February and May 2024 also reported that the issue was under discussion. In the Board of Governors resolution of June 5, 2024, the IAEA called on Iran to withdraw its refusal to accept inspectors, referring to the Director General's assessment that Iran's refusal to accept inspectors would affect the IAEA's capability to conduct verification activities.94 While Iran did not respond, the IAEA stated in its November 2024 report, "During high level meetings between the Agency and Iran in Tehran on 14 November 2024, Iran agreed to respond to the Agency's concerns related

⁹³ Ibid.

⁹⁴ GOV/2024/39, June 6, 2024.

to Iran's withdrawal of the designation of several experienced Agency inspectors by considering the acceptance of the designation of four additional experienced inspector."⁹⁵ It was reported that the inspectors being considered for acceptance are not the same as the inspectors who were rejected in 2023.⁹⁶

In addition to the issues related to acceptance of inspectors, there are other issues that have become apparent in Iran's response to safeguards or through inspections. For example, the August 2024 IAEA Director General's Report mentioned the following points:⁹⁷

The modified Code 3.1 also provides for the submission of fuller design information as the design is developed early in the project definition, preliminary design, construction, and commissioning phases. Iran remains the only State with significant nuclear activities in which the Agency is implementing a comprehensive safeguards agreement but which is not implementing the provisions of the modified Code 3.1.

The IAEA reported that there have been no new technical meetings or discussions with Iran regarding the implementation of the March 2023 IAEA-Iran Joint Statement, noting that there "has been no progress in the past 15 months towards implementing the Joint Statement of 4 March 2023."

On the other hand, Tehran argued at the

2024 NPT PrepCom that Iran has accepted more extensive inspections than other countries, arguing that:

Just in 2023, Iran was subject to 485 inspections amounting to 22% of all IAEA inspections, despite having only about 3% of the world's nuclear facilities. [...] Therefore, my country deserves recognition for its commitment to and cooperation in safeguarding verification activities of the IAEA. The IAEA must conduct its verification activities in a professional, impartial, and independent manner.⁹⁸

At the IAEA General Conference in September 2024, in addition to the aforementioned scale of acceptance of IAEA inspections, Iran made the following arguments regarding its response to IAEA safeguards and the implementation of the JCPOA. As for the refusal to accept IAEA inspectors in September 2023, Iran stated that this was an exercise of its inherent rights based on the CSA. Iran also insisted that the suspension of JCPOA-related measures "was implemented in exchange for the lifting of unjust and illegal sanctions," and that it stopped implementing those JCPOA measures beyond the CSA in response to the United States and other countries' failure to implement the JCPOA.⁹⁹

⁹⁵ GOV/2024/61, November 19, 2024.

⁹⁶ "Iran Offers to Cap Sensitive Uranium Stock as IAEA Resolution Looms," *Reuters*, November 20, 2024, https://www.reuters.com/world/middle-east/iran-offers-cap-sensitive-uranium-stock-avoid-iaea-resolution-2024-11-19/.

⁹⁷ GOV/2024/44, August 29, 2024.

⁹⁸ "Statement by Iran," General Statement, Second Prepcom for the 11th RevCon, July 23, 2024.

^{99 &}quot;Statement by Iran," 68th IAEA General Conference, September 16, 2024.

During the IAEA Director General's visit to Iran in mid-November 2024, discussions between the two sides reportedly resulted in Iran's acceptance to suspend the expansion of its stockpile of 60% enriched uranium. The Director General's opening briefing to the IAEA Board of Governors reported that the proposal to suspend the stockpile expansion requested by the Director General had been accepted by Iran.¹⁰⁰

Meanwhile, France, Germany, the United Kingdom, and the United States submitted a draft resolution that included a request to the Director General to prepare a comprehensive report by March 2025, saying that Iran has failed to offer technically credible information and the necessary cooperation to verify that information.¹⁰¹ The Board resolution was adopted by a majority vote. It included the following items:¹⁰²

- Reiterates its profound concern that Iran has still not provided necessary, full and unambiguous cooperation with the Agency;
- Underscores Iran's obligation to implement modified Code 3.1, and provide all necessary design and preliminary design information;

- Provides access to locations and material the Agency requires for that purpose, as well as for the taking of samples as deemed appropriate by the Agency.
- Requests the Director General to produce a comprehensive and updated assessment on the possible presence or use of undeclared nuclear material in connection with past and present outstanding issues regarding Iran's nuclear program.

Following the adoption of the resolution, the Iranian Ministry of Foreign Affairs and the AEOI issued a joint statement, arguing:¹⁰³

In this context, the actions of the three European nations and the United States—countries with a documented history of reneging on their commitments, including under the Joint Comprehensive Plan of Action (JCPOA), and resorting to unlawful sanctions and pressures against the Iranian nation—are both confrontational and unjustifiable. Rather than fostering the constructive atmosphere established during the Director General's visit, they prematurely proposed a politically motivated resolution against Iran. [...] This politicized and destructive measure

¹⁰⁰ "Director General Briefs Board on Iran Developments, Ukraine Support, Technical Assistance and More," IAEA, November 20, 2024, https://www.iaea.org/newscenter/news/director-general-briefs-board-on-iran-developments-ukraine-support-technical-assistance- and-more.

¹⁰¹ "NPT Safeguards Agreement with Iran: Quad statement to the IAEA Board, November 2024," Gov.UK, November 21, 2024, https:// www.gov.uk/government/speeches/npt-safeguards-agreement-with-iran-quad-statement-to-the-iaea-board-november-2024.

¹⁰² GOV/2024/68, November 21, 2024.

¹⁰³ "Joint Statement of the Ministry of Foreign Affairs and the Atomic Energy Organization of Iran Regarding the Unjust Resolution," Ministry of Foreign Affairs, Iran, November 22, 2024, https://en.mfa.gov.ir/portal/newsview/756954/Joint-Statement-of-the-Ministry-of-Foreign-Affairs-and-the-Atomic-Energy-Organization-of-Iran-Regarding-the-Unjust-Resolution.

undermines the positive momentum achieved between Iran and the Agency.

The statement also revealed that the AEOI Director ordered a directive to operate a significant number of centrifuges of various models.¹⁰⁴ Iran plans to install more than 6,000 additional centrifuges, and in response, the IAEA has reportedly informed Iran of its intention to intensify inspections of the Fordow enrichment plant.¹⁰⁵ On December 7, the IAEA Director General stated that Iran resumed the production of enriched uranium and assessed its capacity to produce 60% enriched uranium was set to rise more than seven to eight times greater than the then current level of 5-7 kg per month.¹⁰⁶

Alleged undeclared activities

Iran asserts that it continues to implement comprehensive safeguards measures. However, the issue regarding the existence of past undeclared activities remains unresolved.

In a report to the IAEA Board dated February 23, 2021, the IAEA Director-General summarized the Agency's assessment of the presence of undeclared nuclear material and activities at four sites that may have been associated with Iran's 1989-2003 clandestine and systematic nuclear program (AMAD Plan). At one of the sites (reported elsewhere to be a warehouse at Turquzabad), environmental sampling revealed artificially-produced uranium particles, indicating that uranium conversion may have taken place, as well as low-enriched uranium (LEU) containing U-236 and depleted uranium with a slightly lower proportion of U-235 than natural uranium. At other two sites (Varamin and Marivan), analysis of environmental sampling indicated the presence of artificially produced uranium particles. The IAEA assessed that the remaining site (Lavisan-Shian) was not worth complementary access because it had been extensively cleared and uranium traces had been removed.¹⁰⁷

A Joint Statement of the IAEA and the AEOI released on March 4, 2023, said that concerning "the outstanding safeguards issues related to the three locations, Iran expressed its readiness to continue its cooperation and provide further information and access to address the outstanding safeguards issues."¹⁰⁸ The

¹⁰⁴ Ibid.

¹⁰⁵ "Iran Plans New Uranium-Enrichment Expansion, IAEA Report Says," *Reuters*, November 29, 2024, https://www.reuters.com/world/middle-east/iran-plans-uranium-enrichment-expansion-natanz-fordow-iaea-report-says-2024-11-28/.

¹⁰⁶ "Exclusive: Iran Dramatically Accelerating Uranium Enrichment to Near Bomb Grade, IAEA Says," *Reuters*, December 7, 2024, https://www.reuters.com/world/middle-east/iran-dramatically-increasing-enrichment-near-bomb-grade-iaea-chief-2024-12-06/.

¹⁰⁷ GOV/2021/15, February 23, 2021.

¹⁰⁸ "Joint Statement by the Atomic Energy Organization of Iran (AEOI) and the International Atomic Energy Agency (IAEA)," IAEA, March 4, 2023, https://www.iaea.org/newscenter/pressreleases/joint-statement-by-the-atomic-energy-organization-of-iran-aeoi-and-the-international-atomic-energy-agency-iaea.

IAEA "Safeguards Statement for 2023" published in 2024 reported that "Iran provided information to the Agency on the presence of uranium particles of anthropogenic origin at one of the three locations in Iran not declared to the Agency where the Agency had conducted complementary access. While its assessment of the undeclared nuclearrelated activities that were undertaken at the undeclared location related to this issue remains unchanged, the Agency regarded the matter as no longer outstanding at this stage."¹⁰⁹

Iran announced at the end of July 2023 that it had submitted new details to the IAEA regarding two sites near Tehran, where inspectors found traces of manmade uranium.¹¹⁰ Despite this development, little progress was made towards resolving the issue.

Other issues concerning undeclared nuclear materials have also arisen. According to the IAEA Director General's report of August, Iran acknowledged that it had incorrectly declared the quantity of uranium at the Uranium Conversion Facility (UCF) in Isfahan, and a new declaration of uranium materials was submitted, but a new discrepancy had arisen as a result of this activity. The IAEA claims to have discovered that the Jebel-Ibn-Hayyan Multipurpose Laboratory (JHL) contained additional unaccounted for nuclear material which could not be explained by accountancy management errors. On August 13, 2024, the IAEA informed Iran that the "final results of the evaluation of the verification results" at UCF indicated that "the amount of nuclear material unaccounted for is greater than the amount previously reported by Iran." As a result, the IAEA stated that the amount of uranium lost from the UCF in relation to past experiments was greater than the amount previously estimated by the IAEA. The IAEA has requested a new technical meeting with Iran to discuss the results of the investigation.¹¹¹

A joint statement issued by France, Germany, the United Kingdom, and the United States at the November IAEA Board of Governors meeting expressed concern about the issue as follows: "As long as such cases exist and are not fully clarified, there remains uncertainty about the possibility of undeclared nuclear material and activities in Iran."¹¹² The resolution adopted at the meeting also stated, "Underscoring the Director General's conclusion that unless and until Iran provides technically credible explanations for the presence of uranium particles of anthropogenic origin at

¹⁰⁹ IAEA, "Safeguards Statement for 2023."

¹¹⁰ Jon Gambrell, "Iran Gives 'Detailed Answers' to UN Inspectors Over 2 Sites Where Manmade Uranium Particles Found," *AP News*, July 26, 2023, https://apnews.com/article/iran-nuclear-program-iaea-answers-uranium-49d750f406b9321b266f9641b00fed75.

¹¹¹ IAEA, GOV/2024/41, August 29, 2024.

¹¹² "NPT Safeguards Agreement with Iran: Quad statement to the IAEA Board, November 2024," Gov.UK, November 21, 2024, https:// www.gov.uk/government/speeches/npt-safeguards-agreement-with-iran-quad-statement-to-the-iaea-board-november-2024.

undeclared locations and informs the Agency of the current location(s) of the nuclear material and/or contaminated equipment, the Agency cannot confirm the correctness and completeness of Iran's declarations under its NPT Safeguards Agreement." In addition, this resolution requested the Director General to produce a comprehensive and updated assessment on the possible presence or use of undeclared nuclear material in connection with past and present outstanding issues regarding Iran's nuclear program.¹¹³

On October 25, Israel claimed to have carried out an attack on a nuclear-related facility inside a military installation located in Parchin, a suburb of Tehran. Israeli Prime Minister Benjamin Netanyahu said that Israel had attacked a component of Iran's nuclear program. An unnamed Israeli official was quoted as saying that the strike destroyed "sophisticated equipment used to design the plastic explosives that surround uranium in a nuclear device."114 The IAEA Director General said at a press conference on November 20 that the IAEA did not consider the attacked site a nuclear facility because there was no information supporting the presence of nuclear material there.¹¹⁵

<u>Syria</u>

As for Syria, the IAEA assessed that the facility at Dair Alzour, which was destroyed by an Israeli air raid in September 2007, was very likely a clandestinely constructed, undeclared nuclear reactor. Although the IAEA has repeatedly called on Syria to cooperate fully with the Agency so as to resolve the outstanding issues, Syria has not responded to that request.¹¹⁶

In the meantime, the IAEA reported that inspections were carried out at the Miniature Neutron Source Reactor facility near Damascus and a location outside facilities (LOF) in Homs in 2022; and that it found no indication of diversion of declared nuclear material from peaceful activities.¹¹⁷

Acquiring naval nuclear propulsion by NNWS

Regarding acquisition of naval nuclear propulsion (specifically, for nuclear submarines) by NNWS, at the AUKUS (Australia-U.K.-U.S. Security Cooperation Partnership) summit meeting on March 13, 2023, detailed plans were disclosed in terms of the provision of nuclear submarines to Australia. This includes the delivery of three U.S. nuclear-powered attack submarines (Virginia-class) to Australia in the early 2030s, and delivery

¹¹³ IAEA, GOV/2024/62, November 19, 2024.

¹¹⁴ "Israel Hit Part of Iran's Nuclear Programme, Netanyahu Says," *BBC News*, November 19, 2024, https://www.bbc.com/news/articles/cy0l1ep34pro.

¹¹⁵ "Israel Struck No Iranian 'Nuclear Facilities,' IAEA Director General," *AFP*, November 21, 2024, https://www.afpbb.com/articles/-/3550159. (in Japanese)

¹¹⁶ IAEA, "Safeguards Statement for 2023."

¹¹⁷ Ibid.

by the United Kingdom of the nuclearpowered attack submarine SSN-AUKUS in the late 2030s. In addition Australia will deliver the first SSN-AUKUS built in Australia to the Royal Australian Navy in the early 2040s.¹¹⁸ In March 2024, the United Kingdom announced that it has begun designing the SSN-AUKUS.¹¹⁹ On August 5, the three countries signed an agreement that allows the transfer to Australia of nuclear reactors, related technology, and nuclear fuel to be installed in nuclear submarines and that stipulates prevention of their proliferation outside the framework of the AUKUS.¹²⁰

In the statement of its Director General in April 2024, the IAEA stated: "The consultation process with Australia on the structure and content of an Article 14 arrangement is ongoing. As part of this process, the Agency is discussing with Australia technical aspects and ways to facilitate possible verification and monitoring activities by the Agency, as well as voluntary transparency measures. [...] The Agency took particular note of the information related to maintenance activities to be conducted on U.S. nuclear submarines (SSNs) in Australia starting in the second half of 2024. The Agency is ensuring that any necessary technical measures will be in place to address the possible implication on the application of Agency safeguards in Australia during maintenance activities in the context of Australia's safeguards obligations."¹²¹

Australia issued a statement on behalf of the three countries, and stated:¹²²

As stated in the report, Australia and the IAEA continue to engage on a range of topics relating to the structure and the content of Australia's Article 14 arrangement, including provisions for advance notification, reporting and verification prior to the entry of nuclear material into an Article 14 arrangement, and the circumstances under which the arrangement would apply. Other matters under active consideration include ways to facilitate verification and monitoring activities, as well as implementation of voluntary transparency measures, and discussions of Safeguards by Design best practice.

Australia is working with the IAEA to develop a safeguards and verification

¹¹⁸ "Joint Leaders Statement on AUKUS," March 13, 2023, https://www.whitehouse.gov/briefing-room/ statements-releases/2023/03/13/joint-leaders-statement-on-aukus-2/.

¹¹⁹ Defence Nuclear Enterprise, *Delivering the UK's Nuclear Deterrent as a National Endeavour*, March 2024, p. 8, https://assets.publishing.service.gov.uk/media/671b8641956d9b52e8c6d276/Defence_Nuclear_Enter prise_Command_Paper.pdf.

¹²⁰ "Agreement among the Government of Australia, the Government of the United Kingdom of Great Britain and Northern Ireland, and the Government of the United States of America for Cooperation Related to Naval Nuclear Propulsion (Washington, 5 August 2024)," Parliament of Australia, August 11, 2024, https://www.aph.gov.au/Parliamentary_Business/Tabled_Documents /6967.

¹²¹ "IAEA Director General Statement in Relation to AUKUS Announcement," IAEA, April 9, 2024, https://www.iaea.org/newscenter/pressreleases/iaea-director-general-statement-in-relation-to-aukusannouncement-0.

¹²² "Nuclear safeguards: AUKUS statement to the IAEA Board of Governors, November 2024," Gov.UK, November 20, 2024, https://www.gov.uk/government/speeches/nuclear-safeguards-aukus-statement-to-the-iaea-board-of-governors-november-2024.

approach for its program that sets the highest non-proliferation standard, within the framework of its CSA and Additional Protocol. This will not involve a template or a prescriptive 'one size fits all' approach. Such an approach would not be effective given state specific variations between naval nuclear propulsion programs. Rather, as indicated in the Director General's report, the goal is to ensure that the Agency can continue to meet its technical safeguards objectives at all times, while protecting classified information.

China, which has harshly criticized the provision of nuclear submarines by AUKUS as seriously undermining the international nuclear nonproliferation system, submitted a working paper to the NPT PrepCom in 2024 outlining the discussions at the May 2024 workshop it hosted.¹²³ In addition, China stated at the general debate as follows:¹²⁴

The AUKUS nuclear submarine cooperation involves for the first time the transfer of large quantities of weapongrade highly enriched uranium from nuclear-weapon States to non-nuclearweapon States, posing serious nuclear proliferation risks. The international community should promote the intergovernmental discussion process under IAEA framework, and the three countries shall not start nuclear-powered submarine cooperation before all parties

reach consensus.

Furthermore, a session of this issue was added to the agenda of the 68th IAEA General Conference by the request from China.¹²⁵ China argued, "AUKUS was blatant nuclear proliferation and ran counter to the purpose and principles of the NPT. It constituted strategic military cooperation between two nuclear-weapon States and a non-nuclear-weapon military ally, involving the transfer of several tons of weapons-grade HEU, which transgressed the safeguards regime." Beijing also stated, "[T]he AUKUS safeguards arrangement might be the most controversial, challenging and divisive issue in the history of Agency safeguards, as it involved safeguards not only for Australia, but also for the UK and the USA-two nuclear-weapon States-and raised many other difficult questions."126

Russia claimed the following at this session:¹²⁷

Although the participants claimed that the submarines would be equipped with conventional, rather than nuclear, weapons, there was no reason for the Russian Federation to take those words on faith. In the USA, the future SSN-AUKUS submarines were openly considered as potential carriers of strategic warheads. Therefore, even if the participants were not currently planning

¹²³ NPT/CONF.2026/PC. II/WP.36, July 12, 2024.

¹²⁴ "Statement by China," General Debate, Second PrepCom for the 11th NPT RevCon, July 23, 2024.

¹²⁵ IAEA, GC (68)/1/Add.2, August 14, 2024.

¹²⁶ IAEA, GC (68)/OR.9, November 2024. para. 52, 56.

¹²⁷ Ibid, para. 76, 80.

to equip the submarines with nuclear weapons, their position could change in the future.

Over the preceding year, the Russian Federation had proposed a number of ways of satisfying Member States' growing interest in the subject, including consideration of the issue by the Standing Advisory Group on Safeguards Implementation, the establishment of an intergovernmental technical expert group and technical briefings by the Secretariat. Other options acceptable to the three AUKUS countries were also possible. So far, however, the Russian Federation's proposals had received no response.

Among the NNWS, Egypt stated, "the safeguards arrangements anticipated under the AUKUS naval nuclear propulsion programme would set an important precedent, with repercussions for the international safeguards system," and should be addressed within a complete, non-discriminatory, non-political institutional framework consistent with the NPT and IAEA mandates.¹²⁸ Iran argued that while the NPT and CSA do not prohibit non-nuclear weapons states from developing nuclear propulsion for non-prohibited activities, they do prohibit support for the acquisition of nuclear weapons by non-nuclear weapons states from nuclear weapons states, which raises serious concerns in the international community.¹²⁹

Pakistan also said that the issue of naval nuclear energy promotion, including AUKUS, warranted a comprehensive discussion by member states for a common understanding on verification procedures.¹³⁰

In response to these views from various countries, Australia, on behalf of AUKUS, provided the following response:¹³¹

[T]he AUKUS partners had engaged in good faith with all Member States, consistent with their commitment to openness and transparency. To that end, Australia had provided an update on its acquisition of naval nuclear propulsion technology during the General Debate, as it had done for the previous two years.

Australia was working with the Agency to develop a safeguards and verification approach for its programme that set the highest non-proliferation standard, including an Article 14 arrangement under Australia's CSA. That would not involve a template, or a prescriptive onesize-fits-all approach, which would be ineffective in view of State-specific variations between naval nuclear propulsion programmes.

It would clearly take time to develop that approach, and detailed technical discussions in the Board of Governors would be premature at the current stage.

On August 5, 2024, prior to the IAEA Board of Governors meeting, AUKUS

¹²⁸ Ibid, para. 86.

¹²⁹ Ibid, para. 71-73.

¹³⁰ Ibid, para. 89.

¹³¹ Ibid, para. 98-100.

signed the "Agreement among the Government of the United Kingdom of Great Britain and Northern Ireland, the Government of Australia, and the Government of the United States of America for Cooperation related to Naval Nuclear Propulsion." This agreement will allow AUKUS to continue to share information on submarine nuclear. propulsion among the partners. It also allows the United Kingdom and the United States to transfer to Australia the materials and equipment necessary for the safe and reliable construction, operation, and maintenance of nuclear submarines carrying conventional weapons under the AUKUS partnership¹³². It was also explained that the agreement reaffirmed the nonproliferation obligations of each of the AUKUS partners, including the NPT, as well as Australia's obligations under the Rarotonga Treaty and CSA and AP.¹³³

On August 15, the IAEA released a statement from the Secretary-General in response to comments on the agreement, stating that consultations would continue on the technical aspects of implementing the IAEA's verification, monitoring, and transparency measures.¹³⁴

The report submitted to the Board of Governors in November also stated that those consultations are continuing and that they will be communicated to the Board when the arrangements are finalized.¹³⁵

Brazil, which launched the construction of a nuclear-powered submarine in November 2023, expected to be the first by a NNWS, announced that it started negotiations with the IAEA under a fourparty agreement among the IAEA, ABACC, Brazil and Argentina. The purpose of this procedure is to ensure the IAEA's continued ability to fulfill its responsibilities for nuclear nonproliferation while protecting sensitive operational and technical information related to Brazil's nuclear submarine propulsion program. Four rounds of discussions were held with the IAEA, and preliminary design information was submitted to the IAEA by Brazil.¹³⁶

A report submitted to the IAEA Board of Governors in November 2024 stated that design information on the prototype reactor is available for design information

¹³² IAEA, GC (68)/OR.9, November 2024, para. 101.

¹³³ "AUKUS Trilateral Statement: 8 August 2024," Gov.UK, August 8, 2024, https://www.gov.uk/government/news/aukus- trilateral-statement-8-august-2024.

¹³⁴ "IAEA Director General Statement in Relation to the Agreement between Australia, the United Kingdom and the United States Related to Naval Nuclear Propulsion," IAEA, August 15, 2024, https://www.iaea.org/newscenter/pressreleases/iaea-director-general-statement-in-relation-to-the-agreement-between-australia-the-united-kingdom-and-the-united-states-related-to-naval-nuclear-propulsion.

¹³⁵ IAEA, GOV/INF/2024/12, November 15, 2024.

¹³⁶ "Statement by Brazil," Cluster 2, Non-proliferation, Second PrepCom for the NPT 11th RevCon, July 26, 2024.

verification.137

Issues concerning Ukraine

Ukraine has adhered to its Comprehensive Safeguards Agreement and Additional Protocol with the IAEA. According to the *IAEA Safeguards Statement 2019*, integrated safeguards were applied to Ukraine. While the *Safeguards Statement 2020* stated that the broader conclusion could not be drawn for Ukraine, the United States and the EU noted that this was not Ukraine's fault, but rather that Russia's occupation of Crimea and the activities of Russian-backed armed groups in eastern Ukraine prevented the IAEA from obtaining the information and access necessary to draw a broader conclusion.¹³⁸

In 2022, the IAEA's safeguards implementation was repeatedly challenged by Russia's aggression against Ukraine and its armed attack and occupation of the Chernobyl and Zaporizhzhia nuclear power plants. However, the IAEA Safeguards Statement 2023 follows previous years statement that: "The armed conflict in Ukraine that began in late February 2022 created unprecedented challenges for the Agency in the implementation of safeguards in Ukraine under the CSA (INFCIRC/550) and the AP (INFCIRC/550/Add.1). Nevertheless, the Agency continued to undertake its vital verification role in Ukraine

throughout the year and was able to conduct sufficient in-field verification activities necessary to draw the safeguards conclusion for Ukraine for 2023."¹³⁹

In the resolution adopted at the IAEA General Conference in September 2024, titled "The safety, security and safeguards in Ukraine," the IAEA Board of Governors "[called] for the urgent withdrawal of all unauthorized military and other personnel from Ukraine's ZNPP and for the plant to be immediately returned to the full control of the competent Ukrainian authorities to ensure its safety and security and in order for the Agency to conduct safe, efficient, and effective safeguards implementation, in accordance with Ukraine's comprehensive safeguards agreement and additional protocol."140

(3) IAEA Safeguards Applied to NWS and Non-Parties to the NPT

Under the NPT, NWS are not required to conclude a CSA with the IAEA. However, to alleviate concerns about the discriminatory nature of the NPT, the NWS have voluntarily agreed to apply safeguards to some of their nuclear facilities and fissile material that are not involved in military activities. All NWS have also concluded tailored Additional Protocols with the IAEA.

¹³⁷ IAEA GOV/INF/2024/13, November 15, 2024.

¹³⁸ "Statement by the United States," IAEA Board of Governors, June 9, 2021, https:// vienna.usmission.gov/iaea-bog-2020-safeguards-implementation-report/; "Statement by the EU," IAEA Board of Governors, June 7-11, 2021.

¹³⁹ IAEA, "Safeguards Statement for 2023."

¹⁴⁰ GC (68)/RES/15, September 20, 2024.

The *IAEA Annual Report 2023*, published in 2024, lists facilities in NWS under Agency safeguards or containing safeguarded nuclear material during 2023.¹⁴¹ The IAEA does not publish the number of inspections conducted in NWS. The safeguarded facilities include the following.

- China: A power reactor, and an enrichment plant
- France: A fuel fabrication plant, a reprocessing plant, and an enrichment plant
- Russia: A separate storage facility
- The United Kingdom: An enrichment plant and two separate storage facilities
- The United States: A separate storage facility

In its Safeguards Statement, "the [IAEA] Secretariat found no indication of the undeclared withdrawal from safeguards of nuclear material to which safeguards had been applied. On this basis, the Secretariat concluded that, for these States, nuclear material in selected facilities to which safeguards had been applied remained in peaceful activities or had been withdrawn from safeguards as provided for in the agreements."¹⁴²

Each NWS has already concluded an IAEA Additional Protocol. Among them, the Additional Protocol concluded by the United States includes provisions for complementary access similar to those in Additional Protocols concluded by NNWS. The United States was the first NWS that has hosted a complementary access visit by the IAEA. The respective Additional Protocols concluded by France and the United Kingdom also include provisions for complementary access, though these are somewhat limited. Compared to the three NWS mentioned above, application of IAEA safeguards to nuclear facilities by China and Russia have been more limited. Their Additional Protocols do not stipulate any provision for complementary access visits.

France stated in its national report submitted to the 10th NPT RevCon, "[A]ll French facilities holding civil nuclear materials are subject to EURATOM inspection." It also reported that certain nuclear fuel cycle facilities in France (including uranium enrichment plant, reprocessing plant and MOX fuel fabrication plant) are subject to IAEA safeguards verification, in addition to those by the EURATOM.¹⁴³

In France, 17 facilities (including 37 material balance areas: MBAs) were subject to IAEA regular inspections in 2023, and of these, inspections were carried out at three facilities selected by the IAEA: the reprocessing facility in La Hague, the enrichment facility in Georges Besse, and the MOX fabrication plant Melox. It also reported that there were 10 inspections and 61 man-days in the same year.¹⁴⁴

¹⁴¹ *LAEA Annual Report 2023*, GC (68)/2, Table A40(a).

¹⁴² IAEA, "Safeguards Statement for 2023."

¹⁴³ NPT/CONF.2020/42/Rev.1, August 1, 2022.

¹⁴⁴ "IAEA Safeguards," Euratom Technical Committee, July 29, 2024, https://www.cte.gouv.

The United Kingdom also reported in its national report submitted to the 10th NPT RevCon that all enrichment and reprocessing in the United Kingdom has been conducted under international safeguards since 1998, and that its safeguards agreement with the IAEA "allows for the application of safeguards on all source or special fissionable material in facilities within the United Kingdom, subject to exclusions for national security reasons only."¹⁴⁵ In the 2023 Safeguards Annual Report of the U.K. Office for Nuclear Regulation (ONR), it explained that 32 inspections were conducted during its reporting period, of which 29 were eligible, and that there were problems with other facilities in terms of procedural issues, system reliability, and staff competence.¹⁴⁶ It must be noted that EURATOM safeguards are no longer in place in the United Kingdom due to its withdrawal from the EU. The United States, like the United Kingdom, also designates all of its civilian nuclear facilities as eligible facilities.

India has concluded an India-specific safeguards agreement (INFCIRC/754), under which India has designated all civilian nuclear facilities subject to the safeguards, and the declared nuclear materials and facilities have been inspected by the IAEA. Israel and Pakistan have concluded facility-specific safeguards agreements based on INFCIRC/66. These non-NPT states have accepted IAEA inspections of the facilities that they declare are subject to these agreements. According to the *LAEA Annual Report 2023*, the facilities placed under IAEA safeguards or containing safeguarded nuclear material in non-NPT states as of December 31, 2023, are as listed below.¹⁴⁷ (The IAEA does not publish the number of inspections conducted in those countries.)

- India: Eleven power reactors, three fuel fabrication plants, two separate storage facilities
- ➢ Israel: One research reactor
- Pakistan: Seven power reactors and two research reactors

Regarding these countries' activities in 2023, the IAEA "concluded that nuclear material, facilities or other items to which safeguards had been applied remained in peaceful activities."¹⁴⁸

In terms of protocols additional to non-NPT states' safeguards agreements (which differ significantly from the model Additional Protocol), the India-IAEA Additional Protocol entered into force in July 2014. This Additional Protocol is similar to those the IAEA concluded with China and Russia, with provisions on

fr/english/Pages/IAEA-and-Euratom-controls/iaeasafeguards.aspx.

¹⁴⁵ NPT/CONF.2020/33, November 5, 2021. EURATOM safeguards are no longer in place in the United Kingdom due to the U.K.'s withdrawal from the EU.

¹⁴⁶ Office for Nuclear Regulation, *Safeguards Annual Report 2023*, pp. 2-3, https://www.onr.org.uk/media/zg3hpjei/safeguards-annual-report-2023.docx.

¹⁴⁷ *LAEA Annual Report 2023*, GC (68)/2/, Table A40(a).

¹⁴⁸ IAEA, "Safeguards Statement for 2023."

providing information and protecting classified information, but not on complementary access. No negotiation has begun to date on similar protocols with Israel or Pakistan.

Some NNWS, including NPDI call on the NWS for further application of the IAEA safeguards to their nuclear facilities to alleviate a discriminative nature that NNWS are obliged to accept full-scope safeguards whereas NWS are not.¹⁴⁹ At the NPT PrepCom in 2024, the NAM countries, in particular, continue to demand that the NWS undertake to accept IAEA full-scope safeguards.¹⁵⁰

(4) Cooperation with the IAEA

One of the most important measures to strengthen the effectiveness of the IAEA safeguards system is to promote the universal application of the Additional Protocol. Among the countries surveyed in this project, Australia, Austria, Canada, France, Germany, Japan, South Korea, Mexico, the Netherlands, New Zealand, Norway, Poland, Sweden, Switzerland, Turkey, the UAE, the United Kingdom and the United States consider the Additional Protocol "an integral part" of the current IAEA safeguards system.

Indonesia acknowledged the importance of the Additional Protocol, although it did not take the position described above, and argued: "Indonesia believes that a strengthened IAEA safeguards system, including the implementation of the Additional Protocol, is a critical component of our collaborative efforts to address the non-proliferation risk associated with all peaceful nuclear activity." Indonesia also stated, "A comprehensive safeguards agreement, in conjunction with an Additional Protocol, contains the verification requirements that can provide assurance that an NPT state party is adhering to its obligations under the Treaty."¹⁵¹

On the other hand, the NAM countries (with some exceptions) argue that the conclusion of the Additional Protocol should remain a voluntary measure for the NPT states parties, and they oppose making its conclusion a standard for the IAEA safeguards system. For instance, Brazil said, "[W]e witness time and again efforts to further widen the asymmetry of obligations imposed by the [NPT]. Such is the case of the calls from some quarters for the Additional Protocol to become the 'new verification standard' for the obligations under Article III of the Treaty contrary to what was agreed in previous NPT Review Conferences and in the yearly IAEA General Conference resolutions. Those consensus documents have consistently recognized the AP as a voluntary measure, and that its adoption is a sovereign decision of any State. Such suggestions constitute attempts to de facto reinterpret the provisions of Article III of the Treaty, akin to an amendment.

¹⁴⁹ NPT/CONF.2015/PC. II/WP.23, April 5, 2013.

¹⁵⁰ NPT/CONF.2026/PC. II/WP.27, June 26, 2024.

¹⁵¹ "Statement of Indonesia," Cluster 2, First PrepCom for the 11th NPT RevCon, August 7, 2023.

Besides unwarranted, both in legal and political terms, it also would set a precedent for future reinterpretations of any NPT provision."152 Egypt also stated, "Egypt strongly rejects any attempts to impose any additional non-proliferation obligations that go beyond Article III [of the NPT]. Proposals that strive to link instruments such as the voluntary Additional Protocol (AP) to the Treaty's obligations represent an unacceptable breach of the delicate balance that the grand bargain of the Treaty [that is, nonproliferation, nuclear disarmament and peaceful uses of nuclear energy] aims to achieve."153 Iran has also consistently argued that it is unacceptable to standardize and seek acceptance of the Additional Protocol.¹⁵⁴

In addition to the NAM States, Russia continued to state, "We note the significance of Additional Protocols to IAEA Safeguards Agreements for ensuring confidence in the peaceful nature of all nuclear material in the country and the country's nuclear activities. At the same time, it is our firm belief that concluding such additional protocols remains a voluntary step."¹⁵⁵

In a resolution titled "Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards," adopted at the 2024 IAEA General Conference, the following points were stated regarding the Additional Protocols:¹⁵⁶

- "[I]t is the sovereign decision of any State to conclude an additional protocol, but once in force, the additional protocol is a legal obligation, encourages all States which have not yet done so to conclude and to bring into force an additional protocol as soon as possible and to implement them provisionally pending their entry into force in conformity with their national legislation."
- "[I]n the case of a State with a comprehensive safeguards agreement supplemented by an additional protocol in force, these measures represent the enhanced verification standard for that State."

The IAEA has developed and approved the "state-level approach (SLA)" based on a state-level concept (SLC) under which the Agency considers a broad range of information about a country's nuclear capabilities and tailors its safeguards activities in each country accordingly, so as to make IAEA safeguards more effective and efficient.

According to the IAEA, as of June 2024, SLAs were developed and approved for implementation for 71 States with a CSA and an Additional Protocol in force, and a broader conclusion; 39 States with a CSA and an Additional Protocol in force but

¹⁵² "Statement by Brazil," Second PrepCom for the 11th NPT RevCon, July 26, 2024.

¹⁵³ "Statement of Egypt," Cluster 2, Second PrepCom for the 11th NPT RevCon, July 26, 2024.

¹⁵⁴ e.g. "Statement of Iran," Cluster 2, First PrepCom for the 11th NPT RevCon, August 7, 2023.

¹⁵⁵ "Statement by Russia," Cluster 2, Second PrepCom for the 11th NPT RevCon, July 26, 2024.

¹⁵⁶ GC (68)/RES/12, September 19, 2024.

without a broader conclusion; 25 States with a CSA but no Additional Protocol in force; and one State with a Voluntary Offer Agreement and an Additional Protocol in force.¹⁵⁷ The report also states that the SLA was developed for two countries (France and the United Kingdom) that have VOAs and an Additional Protocol in force.¹⁵⁸

Regarding research and development of safeguards technologies, as part of its long-term plan,¹⁵⁹ the IAEA conducted the "Development and Implementation Support Programme for Nuclear Verification 2024-2025,"¹⁶⁰ in which 24 countries (including Australia, Brazil, Canada, China, France, Germany, Japan, South Korea, the Netherlands, Norway, Russia, South Africa, Sweden, Switzerland, the United Kingdom and the United States) and the European Commission (EC) participated.

The countries surveyed that had outstanding obligations to the IAEA regular budget in 2023 (as of September 2024) was Iran.¹⁶¹

In addition, regarding issues related to new technologies, the Vienna Group of Ten underlined in its working paper for the 2024 PrepCom "the importance of international cooperation in assessing and addressing, in a timely manner, any legal and regulatory challenges in connection with the deployment of new technologies, including, but not limited to, small modular reactors, advanced reactor technologies and transportable nuclear power plants."¹⁶²

(5) Implementing Appropriate Export Controls on Nuclear-Related Items and Technologies

A) Establishment and implementation of the national control systems

There were few remarkable developments in 2024 regarding establishing and implementing national control systems regarding export controls on nuclearrelated items and technologies. The following countries surveyed in this report belong to the four international export control regimes,¹⁶³ including the Nuclear Suppliers Group (NSG), have national implementation systems in place, and have implemented effective export controls regarding nuclear- (and other WMD-) related items and technologies through list and catch-all controls: Australia, Austria, Belgium, Canada, France, Germany, Japan, South Korea, the Netherlands, New

¹⁵⁷ GC (68)/9, July 19, 2024.

¹⁵⁸ Ibid.

¹⁵⁹ IAEA, "IAEA Department of Safeguards Long-Term R&D Plan, 2012-2023," January 2013.

¹⁶⁰ IAEA, "Development and Implementation Support Programme for Nuclear Verification 2024-2025," January 2024.

¹⁶¹ GC (68)/INF/8, September 13, 2024.

¹⁶² NPT/CONF.2026/PC. II/WP.11, May 28, 2024.

¹⁶³ Aside from the NSG, Australia Group (AG), Missile Technology Control Regime (MTCR), and Wassenaar Arrangement (WA).

Zealand, Norway, Poland, Sweden, Switzerland, the United Kingdom and the United States.

Canada announced a review of the "Nuclear Non-proliferation Import and Export Control Regulations" in its regulatory plan for 2024-2026. The revisions will harmonize the control list with international export control regimes, introduce license exemptions, and change the information submitted when applying for import and export.¹⁶⁴

These countries have also made proactive efforts to strengthen export controls. For example, Japan has held an annual Asian Export Control Seminar, inviting Asian countries and other major countries from outside the region, to promote Asian and international non-proliferation efforts, although it could not be convened in 2021 due to the COVID-19 pandemic. At the 29th Asian Export Control Seminar in February 2024, approximately 180 persons in charge of export control from 34 Asian and other regional major countries/ regions, as well as eight international and other organizations, attended. At the seminar, the following issues were discussed, inter alia: export control efforts in Asia; analysis of the economic benefits of introducing a security export control system; outreach on intangible technology

transfer at universities and research institutions; and best practices in enforcement.¹⁶⁵ In addition, the Integrated Support Center for Nuclear Nonproliferation and Nuclear Security (ISCN) of the Japan Atomic Energy Agency (JAEA) has provided training related to safeguards. The ISCN held an online training course on the identification of WMD-related materials and equipment under the IAEA Additional Protocol. It provided training from the perspective of reporting export information on nuclearrelated materials and equipment required under the IAEA Additional Protocol, and 19 people from 12 countries in the Asia-Pacific region participated.¹⁶⁶

In addition, the Vienna Group of Ten in its working paper submitted to the NPT PrepCom proposed the following: "Before supplying nuclear material, sensitive equipment or technology, States parties have the responsibility to seek assurance that the recipient State has in place Non-Proliferation Treaty-related IAEA safeguards, an adequate nuclear security regime, a minimum set of measures to combat illicit trafficking and rules and regulations for appropriate export controls in cases of retransfer."¹⁶⁷

Among other countries surveyed in this project, Brazil, China, Kazakhstan,

¹⁶⁴ "Regulations Amending Certain Regulations Made Under the Nuclear Safety and Control Act (Imports, Exports and Safeguards)," *Canada Gazette*, Part I, Volume 158, Number 13, March 30, 2024, https://canadagazette.gc.ca/rp-pr/p1/2024/2024-03-30/html/reg1-eng.html.

¹⁶⁵ "The 30th Asian Export Control Seminar was Held," Ministry of Economy, Trade and Industry, February 22, 2024, https://www.meti.go.jp/english/press/2024/0222_004.html.

¹⁶⁶ Integrated Support Center for Nuclear Nonproliferation and Nuclear Security, Japan Atomic Energy Agency, *ISCN Newsletter*, No. 335, November 2024, pp. 48-50.

¹⁶⁷ NPT/CONF.2026/PC. II /WP.11, May 28, 2024.

Mexico, Russia, South Africa and Turkey are NSG members. These countries have all set up export control systems, including catch-all controls.

On the other hand, Russia has received missiles and artillery shells from North Korea, and NATO Secretary General Mark Rutte noted in December 2024 that Russia may have provided nuclear and missile-related technology to North Korea in return for missiles and artillery shells.¹⁶⁸ The "Comprehensive Partnership Treaty" between Russia and North Korea reportedly stipulates scientific and technological cooperation, including in the field of peaceful nuclear energy.¹⁶⁹ Meanwhile, as mentioned below, China has provided nuclear reactors to Pakistan in violation of NSG guidelines. The extent to which these countries have properly implemented export controls has been questioned.

As for non-NSG members, Egypt, Indonesia and Saudi Arabia have yet to establish sufficient export control legislations and systems. Among them, Saudi Arabia promulgated the "Law of Nuclear and Radiological Control" in 2018, which stipulates that permission is required for the import and export of nuclear materials and nuclear-related equipment and materials.¹⁷⁰ The specific technologies are said to be determined by the Saudi Arabia's national regulatory authority, but it was unable to obtain detailed information. In addition, the definition of import and export is also stated as "Transferring any nuclear, nuclear-related components, or radioactive material into or out of the Kingdom." It was unable to obtain information confirming the details of system development, such as whether it corresponds to re-transfer.¹⁷¹

India, Israel and Pakistan have also set up national export control systems, including catch-all controls. In 2024, the NSG was again unable to achieve a consensus on India's membership application. China, the main opponent to this application, has argued that applicant countries must be parties to the NPT.¹⁷² It has also been reported that China will not accept India's participation in the NSG unless Pakistan is also accepted as a member.¹⁷³ Pakistan

¹⁶⁸ "Press conference by NATO Secretary General Mark Rutte following the second day of meetings of the NATO Ministers of Foreign Affairs in Brussels," NATO, December 4, 2024, https://www.nato.int/cps/en/natohq/opinions_230977.htm.

¹⁶⁹ "DPRK-Russia Treaty on Comprehensive Strategic Partnership," *KCNA*, June 20, 2024, http://www.kcna.co.jp/index-e.htm.

¹⁷⁰ "Saudi Arabian Nuclear Regulatory Legal and Operational Framework," Nuclear and Radiological Regulatory Commission, https://nrrc.gov.sa/en/Pages/Legal-Framework.aspx.

¹⁷¹ "Law of Nuclear and Radiological Control," Nuclear and Radiological Regulatory Commission, https://nrrc.gov.sa/Documents/NRRC_Systems/Law%20of%20Nuclear%20and%20Radiological%20 Control.pdf.

¹⁷² "Foreign Ministry Spokesperson Geng Shuang's Regular Press Conference," Ministry of Foreign Affairs of China, January 31, 2019, http://ag.china-embassy.gov.cn/eng/fyrth/201901/t201 90131_3487343.htm.

¹⁷³ "China 'Coordinating' with Pakistan to Block India's Entry into NSG," *Hindustan Times*, May 13, 2016, https://www.hindustantimes.com/india/china-coordinating-with-pakistan-to-block-india-s-entry-into-

has argued that, as a state behaving responsibly regarding nuclear safety and security, it qualifies for acceptance as an NSG member.¹⁷⁴

As of the end of 2024, the status of export control implementation by North Korea, Iran and Syria remains unclear. Cooperation among these countries in ballistic missile development continues to be a concern, as mentioned below. In addition, in past, North Korea was involved in constructing a graphitemoderated reactor in Syria to produce plutonium.

Argument on Access to Technology of Peaceful Purpose

While some argue for the universalization of export control regime development, others question the universality and comprehensiveness of the existing export control regime.

The NAM countries, including Egypt and Indonesia, underscored that many of the export control regimes were developed outside of the UN framework in selective, non-inclusive ways and without proper involvement of developing countries, as stating: "The Group of Non-Aligned States Parties to the Treaty emphasizes that proliferation concerns are best addressed through multilaterally negotiated, universal, comprehensive and non-discriminatory agreements. The Group further emphasizes that nonproliferation control arrangements should be transparent and open to participation by all States and should ensure that they do not impose restrictions on access to material, equipment and technology for peaceful purposes required by developing countries for their continued development¹⁷⁵.

In response to this argument, member states of the NSG and Zangger Committee have recommended that NPT parties make use of the control lists and good practices as the NSG Zanger Committee contributes to the prevention of the proliferation of WMDs.¹⁷⁶

These issues were discussed at the UN General Assembly in 2024, where the Resolution on the Promotion of Peaceful Uses in the Context of International Security was adopted¹⁷⁷. Its preamble included the following sentences:

Noting with concern the undue and increasing restrictions on exports to Member States, especially developing countries, of materials, equipment and technology for peaceful purposes, in particular unilateral coercive measures

nsg/story-wrwpjWezo4ciijvdjx2iRO.html.

¹⁷⁴ "Pakistan's Positions & Policies on Arms Control, Non-Proliferation & Disarmament Related Issues," Ministry of Foreign Affairs, Government of Pakistan, https://mofa.gov.pk/arms-control-and-disarmament.

¹⁷⁵ NPT/CONF.2026/PC.II/WP.25, June 26, 2024.

¹⁷⁶ "EU Statement on Cluster III (peaceful uses of nuclear energy)," July 29, 2024; "Nuclear Non-Proliferation. Déclaration prononcée par l'Ambassadeur Julien Thöni Représentant Permanent de la Suisse auprès de la Conférence du Désarmement ," July 29, 2024.

¹⁷⁷ A/RES/79/80, December 2, 2024.

that violate international law, and the attempt to impose these measures through non-proliferation control arrangements,

Emphasizing that proliferation concerns are best addressed through multilaterally negotiated, universal, comprehensive and non-discriminatory agreements,

Emphasizing also that non-proliferation control arrangements should be transparent and inclusive, in line with their respective mandates, and should ensure that no undue restrictions are imposed on access to materials, equipment and technology for peaceful purposes required by developing countries for their continued sustainable development.

The resolution also included a call for member states not to maintain restrictions that are inconsistent with their nonproliferation obligations; and to identify gaps and challenges through continued dialogue on promoting international cooperation on peaceful uses.¹⁷⁸ The resolution was adopted by the UN General Assembly with 105 votes in favor (including Brazil, China, North Korea, Egypt, Indonesia, Iran, Kazakhstan, Pakistan, Russia, Saudi Arabia, South Africa and Syria), 53 votes against (including Australia, Austria, Canada, France, Germany, Israel, Japan, South Korea, the Netherlands, New Zealand, Norway, Poland, Sweden, Switzerland, Turkey, the United Kingdom and the United States), and 24 abstentions (including India and Mexico).¹⁷⁹

Explaining its opposition to this resolution, Japan, for instance, argued that the resolution pitted peaceful uses against nonproliferation, and that the export control regime would foster trust among countries and promote peaceful uses of technology.¹⁸⁰ New Zealand also argued that the resolution undermines efforts to prevent the proliferation of weapons and sensitive technologies, rejecting the claim by the supporting countries of the resolution that the undue restrictions are imposed.¹⁸¹

B) Requiring the conclusion of the Additional Protocol for nuclear exports

Under the NSG Guidelines Part I, one of the conditions for supplying materials and technology designed specifically for nuclear use is to accept the IAEA comprehensive safeguards. In addition, NSG member states agreed on the following principle in June 2011:

[S]uppliers should authorize transfers, pursuant to this paragraph, only when the recipient has brought into force a

¹⁷⁸ Ibid.

¹⁷⁹ "Promoting International Cooperation on Peaceful Uses in the Context of International Security: Resolution / Adopted by the General Assembly," UN Digital Library, December 2, 2024, https://digitallibrary.un.org/record/4068917.

¹⁸⁰ "79th UN General Assembly First Committee Explanation of Vote (Cluster 5)," https://reachingcriticalwill.org/images/documents/Disarmament-fora/1com/1com24/eov/L53_Japan.pdf.

¹⁸¹ "Statement by Christine Nam First Secretary, New Zealand Permanent Mission to the UN," November 6, 2024, https://reachingcriticalwill.org/images/documents/Disarmament-fora/1com/1co m24/eov/L53_NZ.pdf.

Comprehensive Safeguards Agreement, and an Additional Protocol based on the Model Additional Protocol or, pending this, is implementing appropriate safeguards agreements in cooperation with the IAEA, including a regional accounting and control arrangement for nuclear materials, as approved by the IAEA Board of Governors.¹⁸²

The Non-Proliferation and Disarmament Initiative (NPDI) and the Vienna Group of Ten have argued that the conclusion and implementation of the CSA and the Additional Protocol should be a condition for new supply arrangements with NNWS.¹⁸³ Some of the bilateral nuclear cooperation agreements that Japan and the United States concluded recently with other countries make the conclusion of the Additional Protocol a prerequisite for their cooperation with the respective partner states.

The G7 also expressed its support for further discussions at the NSG to condition the conclusion of the Additional Protocol on nuclear-related exports for peaceful purposes in a Non-Proliferation Director-General's (NPDG) statement in April 2024.¹⁸⁴

On the other hand, the NAM continues to argue that supplier countries should refrain from imposing or maintaining any

restrictions or limitations on transfers of nuclear equipment, material and technology to other states parties to the NPT and their respective comprehensive safeguards agreements, stating: "The Group of Non-Aligned States Parties to the Treaty emphasizes that strict observance of and adherence to IAEA comprehensive safeguards and to the [NPT] are a condition for any cooperation in the nuclear area with States not parties to the Treaty, or for any supply arrangement with such States for the transfer of source or special fissionable material, or equipment or material specially designed or prepared for the processing, use or production of special fissionable material."185

China and Russia also oppose the imposition of additional conditions and obligations. For instance, Russia said, "Russia finds inadmissible any attempts to limit the access to the benefits of peaceful atom for any State compliant with its nonproliferation obligations. Consequently, we do everything we can to counteract the use of the NPT to pursue political and economic tasks that are not directly related to the non-proliferation issues."¹⁸⁶

While the NPT does not prohibit NNWS from enriching uranium or reprocessing spent fuel, provided these activities are for

¹⁸² INFCIRC/254/Rev.12/Part 1, July 26, 2011.

¹⁸³ NPT/CONF.2026/PC. I/WP.17, June 15, 2023; "Statement of New Zealand," Cluster 2, First PrepCom for the 11th NPT RevCon, August 4, 2023.

¹⁸⁴ "Statement of the G7 Non-Proliferation Directors Group," G7, April 19, 2024, para. 10, https://www.mofa.go.jp/mofaj/ files/100657204.pdf.

¹⁸⁵ NPT/CONF.2026/PC. II/WP.25, June 26, 2024.

¹⁸⁶ "Statement by Russia," Cluster 3, Peaceful use of nuclear energy, Second PrepCom for the 11th NPT RevCon, July 29, 2024.

peaceful purposes and under IAEA safeguards, such activities remain highly sensitive due to proliferation concerns. The spread of enrichment and reprocessing technologies implies that more countries could gain the capability to produce nuclear weapons. As previously noted, the Nuclear Suppliers Group (NSG) guidelines stipulate that the recipient state must implement the Additional Protocol as a condition for receiving transfers of enrichment or reprocessing facilities, equipment or technology.

The U.S.-UAE Nuclear Cooperation Agreement concluded in 2009 stipulates a so-called "gold standard"—i.e. that the recipients are obliged to forgo enrichment and reprocessing activities. However, other bilateral agreements concluded and updated by the United States (except that with Taiwan) do not stipulate similar obligations.¹⁸⁷ In the meantime, the nuclear cooperation agreements that Japan has signed with the UAE and Jordan, respectively, prohibit the enrichment and reprocessing of nuclear materials transferred, recovered or produced under the agreements.

The question of whether the nuclear cooperation agreement currently under negotiation between Saudi Arabia and the United States will adhere to the "gold standard" has garnered significant public attention. The United States has requested that Saudi Arabia renounce enrichment and reprocessing on its territory as part of the agreement. However, Saudi Arabia has yet to agree to this stipulation. Meanwhile, as previously mentioned, while Saudi Arabia has not yet concluded an amended SQP, a CSA or an Additional Protocol, Riyadh announced that it had been working toward concluding a comprehensive safeguards agreement by the end of 2024.

C) Implementation of the UNSCRs concerning North Korean and Iranian nuclear issues

North Korea

With regard to the North Korean nuclear issue, UN Member States are obliged to implement measures set out in the UN Security Council resolutions, including embargoes on nuclear-, other WMD-, and ballistic missile-related items, material, and technologies.

The Panel of Experts, established pursuant to UNSCR 1874 (2009), until last year published biannual reports on its findings and recommendations about implementing the resolutions. However, on March 28, 2024, Russia vetoed a draft Security Council resolution to extend the term of this Panel of Experts, despite 13 countries' support (and China's abstention). As a result, the term of this panel expired on April 30, 2024.

Prior to the vote, Russia's UN Ambassador Vassily Nebenzia said, "[the experts'] work is increasingly being reduced to playing into the hands of Western approaches, reprinting biased

¹⁸⁷ The U.S.-Mexico Nuclear Cooperation Agreement concluded in May 2018, and it is stated in the preamble that Mexico will not conduct sensitive nuclear activities, which is referred to as a "silver standard."

information and analyzing newspaper headlines and poor quality photos." Criticizing Russia's veto, U.S. Deputy Ambassador to the U.N. Robert Wood said that "Moscow [had] undermined the prospect of the peaceful, diplomatic resolution of one of the world's most dangerous nuclear proliferation issues."¹⁸⁸ The South Korean representative also criticized Russia for exercising its veto power, arguing that the panel's activities served a most vibrant and significant subsidiary bodies within the Security Council.¹⁸⁹

Attempts to replace the functions of the Panel of Experts are being explored. On May 1, 2024, U.S. Ambassador to the UN Linda Thomas-Greenfield issued a joint statement on behalf of 50 countries stating, "[W]e must now consider how to continue access to this kind of objective, independent analysis in order to address the DPRK's unlawful WMD and ballistic missile advancements."¹⁹⁰

On October 16, Australia, Canada, France, Germany, Italy, Japan, South Korea, the Netherlands, New Zealand, the United Kingdom, and the United States announced the establishment of a Multilateral Sanctions Monitoring Team (MSMT) to investigate and report on the implementation of Security Council resolutions regarding North Korea. Participating countries to the joint statement of its establishment expressed the intention to establish the MSMT as a multilateral mechanism to monitor and report on violations and evasions of sanctions provided by relevant Security Council resolutions, and reaffirmed that the road to dialogue remains open, while underscoring their shared determination to fully implement the Security Council resolutions on North Korea. They also called on all states to join the global effort to maintain international peace and security.¹⁹¹ In response, North Korean Foreign Minister Choe Son Hui condemned the MSMT in a press statement as "utterly unlawful and illegitimate in terms of its justification for existence and purpose, and its existence itself constitutes a denial of the UN Charter."¹⁹² At the Security Council's open briefing on North Korea on December 18, 2024, Russia's ambassador to the UN, criticized the MSMT, saying that its

¹⁸⁸ "Russia Blocks Renewal of North Korea Sanctions Monitors," *Reuters*, March 29, 2024, https://www.reuters.com/world/russia-blocks-renewal-north-korea-sanctions-monitors-2024-03-28/.

¹⁸⁹ "Security Council Fails to Extend Mandate for Expert Panel Assisting Sanctions Committee on Democratic People's Republic Korea," United Nations Meetings and Coverage and Press Releases, March 28 2024, https://press.un.org/en/2024/sc15648.doc.htm.

¹⁹⁰ "Joint Statement Delivered by Ambassador Linda Thomas-Greenfield at the UN Security Council Stakeout on the 1718 Committee Panel of Experts" United States Misson to the United Nations, May 1, 2024, https://usun.usmission.gov/joint-statement-delivered-by-ambassador-linda-thomas-greenfield-at-the-un-security-council-stakeout-on-the-1718-committee-panel-of-experts/.

¹⁹¹ "Joint Statement on Establishing Multilateral Sanctions Monitoring Team (MSMT)," Ministry of Foreign Affairs Japan, October 16, 2024, https://www.mofa.go.jp/mofaj/press/release/pressit _000001_01273.html.

¹⁹² "DPRK Foreign Minister Choe Son Hui Issues Press Statement," KCNA, October 20, 2024, http://www.kcna.co.jp/item/2024/202410/news20/20241020-02ee.html.

establishment bypassed the Security Council, which "directly contravenes the UN Charter, since it undermines the exclusive prerogatives of the Security Council on monitoring the implementation of its sanctions measures."¹⁹³

The Panel of Experts' latest report published in March 2024, pointed out North Korea's activities in violation of the UNSCRs, including the following matters:¹⁹⁴

- North Korea continues evading sanctions, including smuggling petroleum products at sea by disguising the identifiers of ships or ship-to-ship transfer.
- A company persists in selling military communication equipment made in North Korea.
- Groups of cyber threat actors under the North Korean Reconnaissance General Bureau are stealing intellectual property, blueprints, and other information that can be used in WMDs or acquiring funds for the WMD program through cyber attacks on defense-related companies in various countries.
- 58 suspected cyber attacks by North Korea on cryptocurrency-related

companies between 2017 and 2023, valued at approximately 3 billion dollars, which reportedly help to fund the country's development of weapons of mass destruction.

In addition to the report of the Panel, the following North Korean activities were also reported in 2024.

 \geq On July 25, cybersecurity-related government agencies of the United States, United Kingdom, and South Korea jointly released a report on North Korea's state-sponsored cyber attacks.¹⁹⁵ The other report released at the same time stated that groups such as Andariel, Onyx Sleet, DarkSeoul, Silent Chollima, and Stonefly/Clasiopa under the North Korean Reconnaissance General Directorate are targeting defense, aerospace, nuclear, and engineering organizations to obtain highly sensitive technical information and intellectual property. Examples of theft of crypto assets were also reported, including the theft of \$147.5 million worth of crypto assets from the exchange HTX that occurred at the end of 2023.196 In addition, on December 24, the National Police Agency of Japan announced that approximately 48.2

¹⁹³ "Statement by Permanent Representative Vassily Nebenzia at a UNSC Briefing on Nonproliferation and the DPRC," Permanent Mission of the Russian Federation to the United States, December 18, 2024, https://russiaun.ru/en/news/dprk_181224.

¹⁹⁴ S/2024/215, March 7, 2024.

¹⁹⁵ "NCSC and Partners Issue Warning over North Korean State-Sponsored Cyber Campaign to Steal Military and Nuclear Secrets," National Cyber Security Centre, July 25, 2024, https://www.ncsc.gov.uk/news/ncsc-partners-vigilant-dprk-sponsored-cyber-campaign.

¹⁹⁶ "Exclusive: North Korea Laundered \$147.5 mln in Stolen Crypto in March, Say UN Experts," *Reuters*, May 15, 2024, https://www.reuters.com/technology/cybersecurity/north-korea-laundered-1475-mln-stolen-crypto-march-say-un-experts-2024-05-14/.

billion yen worth of virtual currency was stolen from a Japanese cryptocurrency operator by a North Korea-participating cyber-attack group called Trader Traitor.¹⁹⁷

- \geq There are concerns that earnings by North Korean IT workers are funding the development of WMDs. The U.S. Department of Justice announced that it had indicted U.S. citizens, Ukrainians, and other foreign nationals for helping North Korean IT workers posing as U.S. citizens and residents to secure employment at U.S. companies.¹⁹⁸ The U.S. Department of State said the IT workers involved in the case were connected to North Korea's Military Industry Department, which oversees North Korea's ballistic missile development and weapons production.199
- On August 21, 2024, the 38 North website—which provides information on North Korea's domestic military and economy, including analysis of satellite imagery—published an analysis regarding the involvement of North Korean researchers and research institutions in the field of artificial intelligence. Scientific and

technological cooperation with North Korea is prohibited by Security Council Resolution 2321.²⁰⁰

- On March 27, the U.S. Department of ≻ Treasury, in conjunction with South Korea, imposed sanctions on two groups and six individuals associated with North Korean financial institutions based in Russia. China, and the United Arab Emirates. These organizations and individuals were working to gain access to the international financial system, which is restricted by UN Security Council and other sanctions. This is believed to be one of the means of financing North Korea's WMD development. The sanctions also include organizations and individuals related to payments for the dispatch of IT workers from North Korea.201
- 38 North reported that data on a North Korean cloud server was found, which was believed to have been subcontracted out by U.S. and Japanese animation production companies. It is considered that this was done as a multiple-order subcontract for the U.S. and Japanese production companies. The 38 North also noted the

¹⁹⁷ "N. Korean Hackers Used Job Offer Message in DMM Bitcoin Theft: Japan Police," *NHK*, December 24, 2024, https://www3.nhk.or.jp/nhkworld/en/news/20241224_04/.

¹⁹⁸ "Charges and Seizures Brought in Fraud Scheme, Aimed at Denying Revenue for Workers Associated with North Korea," U.S. Department of Justice, May 16, 2024, https://www.justice.gov/opa/pr/ charges-and-seizures-brought-fraud-scheme-aimed-denying-revenue-workers-associated-north.

¹⁹⁹ "Rewards for Justice – Reward Offer for Information on North Korean IT Workers," U.S. Department of States, May 16, 2024, https://www.state.gov/rewards-for-justice-reward-offer-for-information-on-north-korean-it-workers/.

²⁰⁰ "North Korea's International Network for Artificial Intelligence Research," *38 North*, August 21, 2024, https://www.38north.org/2024/08/north-koreas-international-network-for-artificial-intelligence-research/.

²⁰¹ "Treasury Sanctions Actors Financing the North Korean Weapons of Mass Destruction Program," U.S. Department of the March 27, 2024, https://home.treasury.gov/news/press-releases/jy2215.

importance of due diligence in ITrelated outsourcing.²⁰²

Regarding the implementation of sanctions against North Korea, there has been particular concern in recent years about the actions of China and Russia. They have consistently defended North Korea, especially during incidents involving missile tests and reconnaissance satellite launches, and have opposed the UN Security Council's issuance of condemnatory statements or the adoption of resolutions against North Korea. In discussions at the Security Council in 2024, they have criticized the sanctionsfocused response.²⁰³

Of particular concern is the rapidly growing closeness of relations between Russia and North Korea. In January 2024, Ukrainian Intelligence Chief Kyrylo Budanov noted in an interview that "North Korea is Russia's biggest arms supplier at present."²⁰⁴ In early January 2024, the U.S. National Security Council (NSC) National Security Communication Advisor John Kirby stated at a press conference that North Korea had provided Russia with dozens of ballistic missiles and launchers, and that on December 30, 2023, a ballistic missile with a range of about 900 km was used against Ukraine.²⁰⁵

On January 10, 2024, a joint statement by the foreign ministers of 48 countries (including Australia, Austria, Canada, France, Germany, Israel, Japan, South Korea, the Netherlands, New Zealand, Norway, Poland, Sweden, the United Kingdom, and the United States) and the European Union was issued, which states, "We condemn in the strongest possible terms the Democratic People's Republic of Korea's (DPRK) export and Russia's procurement of DPRK ballistic missiles, as well as Russia's use of these missiles against Ukraine on December 30, 2023, and January 2, 2024. [...] Our governments stand together in resolute opposition to arms transfers between the DPRK and Russia."206 Russia denied this allegation at an emergency meeting of the

²⁰² "What We Learned Inside a North Korean Internet Server: How Well Do You Know Your Partners?" *38 North*, April 22, 2024, https://www.38north.org/2024/04/what-we-learned-inside-a-north-korean-internet-server-how-well-do-you-know-your-partners/.

²⁰³ "Remarks by Ambassador Fu Cong at the UN Security Council Briefing on the Korean Peninsula Nuclear Issue," Permanent Mission of the People's Republic of China to the UN, November 4, 2024, http://un.china-mission.gov.cn/eng/chinaandun/202411/t20241105_11521163.htm; "Statement by Deputy Permanent Representative Anna Evstigneeva at a UNSC Briefing on the Situation on the Korean Peninsula," Permanent Mission of the Russia Federation to the United Nations, November 4, 2024, https://russiaun.ru/en/news/korea_041124.

²⁰⁴ "Kyrylo Budanov: the Ukrainian Military Spy Chief Who Likes the Darkness," *Financial Times*, January 21, 2024, https://www.ft.com/content/98c005cd-7def-44b5-a938-5243c77520a9.

²⁰⁵ "Press Briefing by Press Secretary Karine Jean-Pierre and NSC Coordinator for Strategic Communications John Kirby, January 4, 2024," The White House. January 4, 2024, https://www.whitehouse.gov/briefing-room/press-briefings/2024/01/04/press-briefing-by-press-secretary-karine-jean-pierre-and-nsc-coordinator-for-strategic-communications-john-kirby-january-4-2024/.

²⁰⁶ "DPRK/Russia: Joint Statement on Ballistic Missile Transfers for the Aggression in Ukraine," European Union, January 9, 2024, https://www.eeas.europa.eu/node/437199_fr.

UN Security Council on January 10, saying that it was misinformation from the United States. North Korea's ambassador to the UN, Kim Song, also stated, "The U.S. pulled up the DPRK which has nothing to do with the discussion of agenda items. This is the vivid reflection of their plight in the tight corner and only reveals its insufficient might and means in the strategic confrontation with Russia. The DPRK does not feel the need to comment on every U.S. groundless accusation."²⁰⁷

During the Security Council's open briefing of the North Korean issue on December 18, 2024, the member countries discussed the involvement of North Korean soldiers deployed to Russia to fight against Ukraine, and the transfer of weapons between Russia and North Korea. The U.S. Ambassador to the U.N. Greenfield presented information that more than 20,000 containers of munitions had so far been sent by North Korea to Russia, and that in return Russia had provided North Korea with an air defense system. Ambassador Greenfield also mentioned an assessment of North Korea's nuclear weapons program as following: "We assess that Russia may be

close to accepting North Korea's nuclear weapons program, reversing Moscow's decades-long commitment to denuclearize the Korean Peninsula."²⁰⁸ Meanwhile, Russia's U.N. Ambassador Nebenzia stated that cooperation with North Korea is a sovereign right and does not violate international law. He also criticized UN Under-Secretary-General Rosemary DiCarlo at the same meeting, referring to a press article about cooperation between Russia and North Korea.²⁰⁹

In February 2024, a report published by the Conflict Armament Research (CAR) revealed that components bearing the trademarks of Western companies were found in the wreckage of a North Korean ballistic missile which Russia had used against Ukraine in January. According to the report, more than 290 electronic components of non-North Korean origin (26 companies headquartered in the United States, Germany, Singapore, Japan, Switzerland, China, the Netherlands, and Taiwan) were identified, of which 75% were related to the U.S. companies and 16% to European companies.²¹⁰ In late September, it was reported that one-third of the ballistic missiles used by Russia against Ukraine were produced in North

²⁰⁷ "Press Statement of DPRK Permanent Representative to UN," KCNA, January 12, 2024, http://www.kcna.co.jp/item/2024/202401/news12/20240112-12ee.html.

²⁰⁸ "Remarks by Ambassador Linda Thomas-Greenfield at a UN Security Council Briefing on Nonproliferation and the Democratic People's Republic of Korea," United States Mission to the United Nations, December 18, 2024, https://usun.usmission.gov/remarks-by-ambassador-linda-thomas-greenfield-at-a-un-security-council-briefing-on-nonproliferation-and-the-democratic-peoples-republic-of-korea-2/.

²⁰⁹ "Statement by Permanent Representative Vassily Nebenzia at a UNSC Briefing on Nonproliferation and the DPRC," Permanent Mission of the Russian Federation to the United States, December 18, 2024, https://russiaun.ru/en/news/dprk_181224.

²¹⁰ "North Korean Missile Relies on Recent Electronic Components," Conflict Armament Research, February 2024, https:// storymaps.arcgis.com/stories/0814c6868bbd45a98b15693a31bd0e7f.

Korea.211

Another concern is the Comprehensive Strategic Partnership Treaty between Russia and North Korea, which went into effect on December 5. The treaty reportedly commits each country to provide "military and other" assistance to the other in the event of external aggression.²¹² The treaty also includes provision on scientific and technological cooperation between the two countries, and the areas of cooperation include nuclear and space related technologies, which are prohibited by Security Council resolutions. Furthermore, upon signing the treaty, President Putin indicated that Russia would continue to oppose the sanctions imposed on North Korea, and that both countries would cooperate in developing new payment systems that are not dominated by Western powers.²¹³

In a joint statement issued on June 28 by 48 countries (including Australia, Austria, Canada, France, Germany, Japan, South Korea, the Netherlands, New Zealand, Norway, Poland, Sweden, the United Kingdom and the United States) and the European Union in response to the Comprehensive Strategic Partnership Treaty, they stated, "We are deeply concerned about the security implications of the advancement of this cooperation for Europe, the Korean Peninsula, the Indo-Pacific region, and around the world."²¹⁴ On July 11, in a joint statement issued at a summit meeting of Australia, Japan, South Korea and New Zealand also stated, "We express grave concern over the increasing military and economic cooperation commitment between the Russian Federation and the DPRK, as highlighted by the signing of the "Treaty on Comprehensive Strategic Partnership", which is contrary to multiple UN Security Council resolutions."215 At the 2024 NPT PrepCom, South Korea stated in its general debate, "In particular, the recently agreed Russia-DPRK Strategic Partnership Treaty includes nuclear cooperation. We call on Russia, which is a depositary government of the NPT, to immediately halt any actions that help enhance the DPRK's military capabilities, which constitute a flagrant violation of Security Council resolutions."216

²¹¹ "60% of Russian Artillery Shells Made in North Korea, or 1/3 Ballistic Missiles, the U.S. Paper," *Kyodo News Agency*, December 23, 2024, https://nordot.app/1244267598574912368. (in Japanese)

²¹² Edward Howell, "North Korea and Russia's Dangerous Partnership: The Threat to Global Security from the Kim- Putin Axis and How to Respond," Chatham House, December 4, 2024, https://www.chathamhouse.org/2024/12/north-korea-and-russias- dangerous-partnership/how-north-korea-benefits.

²¹³ Kelsey Davenport, "North Korea, Russia Strengthen Military Ties," *Arms Control Today*, July/August2024, https://www.armscontrol.org/act/2024-07/news/north-korea-russia-strengthen-milita ry-ties.

²¹⁴ "Joint Statement on the Unlawful Arms Transfer by the Democratic People's Republic of Korea to Russia," Permanent Mission of Japan to the United Nations, June 28, 2024, https://www.un.emb-japan.go.jp/itpr_en/jointstatement062824.html.

²¹⁵ "Joint Statement of the Leaders of New Zealand, Japan, the Republic of Korea, and Australia," Ministry of Foreign Affairs of Japan, July 11, 2024, https://www.mofa.go.jp/files/100696803.pdf.

²¹⁶ "Statement by South Korea," General Statement, Second PrepCom for the 11th NPT RevCon, July 23,
In addition, the following cases of Russian support for North Korea were also reported in 2024.

- On February 6, it was reported that the government had authorized the release of \$9 million of the \$30 million in frozen assets deposited in Russian financial institutions. The funds are reportedly to be used to purchase crude oil in North Korea. It is also reported that a North Korean dummy company has opened an account at a Russian bank.²¹⁷
- The U.S. National Security Communication Advisor John Kirby disclosed that exports of petroleum products from Russia to North Korea exceeded 165,000 barrels in March 2024 alone. UN Security Council sanctions resolutions limit North Korean imports of petroleum products to 500,000 barrels per year.²¹⁸

<u>Iran</u>

The UN Iran Sanctions Committee and Panel of Experts was wound up in 2015 after the conclusion of the JCPOA, at Iran's insistence, and the UN Security Council is now responsible for overseeing the remaining limitations. In accordance with the JCPOA, approval of the Procurement Working Group, established under the agreement, is required for Iranian procurement of nuclear-related items and material. The number of cases has been reported to the Security Council every six months. According to the reports published in June and December 2024, no proposal was under review by the Procurement Working Group.²¹⁹

On the other hand, in response to Iran's nuclear development, including the aforementioned expansion of HEU production, the United States strengthened its sanctions against Iran. On June 27, 2024, the United States announced the freezing of the assets of three UAE companies involved in the transport of Iranian oil and petrochemical products, as well as the seizure of the ships of each company. In a press statement at the time, the United States stated that these sanctions were being imposed in response to concerns about Iran's efforts to increase its uranium enrichment capabilities.²²⁰ On December 4, the United States also imposed sanctions on 35 organizations and vessels, claiming that Iran was using the proceeds

^{2024.}

²¹⁷ "A Russian Bank Account May Offer Clues to a North Korean Arms Deal," *The New York Times*, February 6, 2024, https://www.nytimes.com/2024/02/06/world/asia/north-korea-russia-missiles-bank. html.

²¹⁸ "Russia is Violating UN Limits on Petroleum Shipments to North Korea, White House Says," *AP*, May 3, 2024, https://apnews.com/article/us-russia-north-korea-united-nations-petroleum-6e674af988fa6 5d0661704f075047eed.

²¹⁹ S/2024/435, June 4, 2024; S/2024/880, December 5, 2024.

²²⁰ "Imposing Sanctions on Entities and Vessels Trading in Iranian Petroleum or Petrochemical Products," U.S. Department of States, June 27, 2024, https://www.state.gov/imposing-sanctions-on-entities-and-vessels-trading-in-iranian-petroleum-or-petrochemical-products/.

from its oil exports to fund its nuclear development program and missile and drone development.²²¹ In a December 12 letter to the UN Security Council, France, Germany, and the United Kingdom also "[reiterated their] determination to use all diplomatic tools to prevent Iran from acquiring a nuclear weapon, including using snapback if necessary."²²²

Concerns were also expressed about the provision of nuclear technology from Russia to Iran in connection with the supply of missiles from Iran to Russia, as mentioned below. U.S. Secretary of State Blinken warned Foreign Minister David Lammy during a visit to the United Kingdom in September that Russia was providing Iran with nuclear-related, spacerelated, and other technologies sought by Iran.²²³

Since the start of Russia's invasion of Ukraine, Iran's provision of missiles and drones has been noted; in September 2024, Ukrainian military officials reported that Iran had provided over 200 shortrange ballistic missiles to Russia.²²⁴ In some cases, satellite images identified Russian ships transporting missiles from Iran.²²⁵

On September 10, France, Germany and the United Kingdom stated in a joint statement, "[They] strongly condemn Iran's export and Russia's procurement of Iranian ballistic missiles. This is a further escalation of Iran's military support to Russia's war of aggression against Ukraine and will see Iranian missiles reaching European soil, increasing the suffering of the Ukrainian people. This act is an escalation by both Iran and Russia, and is a direct threat to European security."²²⁶

The G7 also issued a foreign ministers' statement on September 14, condemning Russia and Iran, stating, "Evidence that Iran has continued to transfer weaponry to Russia despite repeated international calls to stop represents a further escalation of Iran's military support to Russia's war of aggression against Ukraine. Russia has used Iranian weaponry such as UAVs to

²²¹ "Imposition of Sanctions on Additional Entities Involved in Trading Iranian Oil," U.S. Department of States, December 4, 2024, https://www.state.gov/imposition-of-sanctions-on-additional-entities-involved-in-trading-iranian-oil/.

²²² "European Countries Say They Could Reimpose Sanctions on Iran," *Barron's*, December 12, 2024, https://www.barrons.com/news/european-countries-say-they-could-reimpose-sanctions-on-iran-3fcc5 0f1.

²²³ "Alarm in UK and US over Possible Iran-Russia Nuclear Deal," *The Guardian*, September 14, 2024, https://www.theguardian.com/politics/2024/sep/14/alarm-in-uk-and-us-over-possible-iran-russia-nucle ar-deal.

²²⁴ "Is Iran Supplying Ballistic Missiles to Russia for the Ukraine War?" *Aljazeera*, September 11, 2024, https://www.aljazeera.com/news/2024/9/11/is-iran-supplying-ballistic-missiles-to-russia-for-the-ukrain e-war.

²²⁵ "Russian Ship Suspected of Delivering Iranian Ballistic Missiles Seen at Caspian Sea Port," *CNN*, September 11, 2024, https://edition.cnn.com/2024/09/11/europe/russia-iran-ballistic-missiles-satellite-intl/index.html.

²²⁶ "Iranian Transfers of Ballistic Missiles to Russia: UK, France and Germany Joint Statement," Gov.UK, September 10, 2024, https://www.gov.uk/ government/news/iranian-transfers-of-ballistic-missiles-to-russia-uk-france-and-germany-joint-statement.

kill Ukrainian civilians and strike their critical infrastructure."²²⁷

On September 13, the United Kingdom imposed new sanctions, banning the export and supply of strategically important goods and technology, including certain unmanned aerial vehicles, turbojets, semiconductor devices and semiconductor device manufacturing equipment.²²⁸ The EU issued a statement condemning the missile transfer.²²⁹ Then, on October 14, the EU announced a freeze of funds and a travel ban to the EU for seven individuals and seven entities, including Iranian airlines and procurement companies, involved in the transfer of drones and related components.²³⁰

Russia and Iran have denied providing or receiving missiles. Russian spokesman Dmitry Peskov denied the allegations but simultaneously mentioned cooperation with Iran, as saying, "[N]ot every time such information corresponds to reality. Iran is our important partner, we are developing our trade and economic relations, and we are developing our cooperation and dialogue in all possible areas, including the most sensitive areas."²³¹ Iranian Foreign Minister Araghchi argued, "Iran has NOT' delivered ballistic missiles to Russia. period - Sanction addicts should ask themselves, how is Iran able to make & supposedly sell sophisticated arms? Sanctions r NOT a solution, but part of the problem."²³²

In response to the UN Secretary General's report on the implementation of Security Council Resolution 2231²³³ issued on December 15, 2023, Iran sent a letter to the UN Secretary General expressing its views.²³⁴ In the letter, Tehran noted that Iran emphasized the need for "full and unconditional implementation" of the JCPOA. In addition, Iran argued that the Secretary-General's report both "ignored

²²⁷ "G7 Foreign Ministers' Statement," Ministry of Foreign Affairs Japan, September 14, 2024, https://www.mofa.go.jp/mofaj/files/100725085.pdf.

²²⁸ "NTE 2024/24: Trade Sanctions against Iran, Introduced in September 2024," Department of Business & Trade, September 16, 2024, https://www.gov. uk/government/publications/notice-to-exporters-202424-trade-sanctions-against-iran-introduced-in-september-2024/nte-202424-trade- sanction s-against-iran-introduced-in-september-2024.

²²⁹ "Iran: Statement by the High Representative on Behalf of the European Union," European Council, September 13, 2024, https://www.consilium.europa.eu/en/press/press-releases/2024/09/13/iran-statement-by-the-high-representative-on-behalf-of-the-european- union/.

²³⁰ "Iran: Seven Individuals and Seven Entities Sanctioned in Response to Iran's Missile Transfer to Russia," European Council, October 14, 2024, https://www.consilium.europa.eu/en/press/press-releases/2024/10/14/iran-seven-individuals-and-seven-entities-sanctioned-in-response-to-iran-s-missile-transfer-to-russia/.

²³¹ "Kremlin Denies American Reports of Iranian Missile Transfers to Russia for Ukraine War," *Tehran Times*, September 9, 2024, https://tehrantimes.com/ news/503481/Kremlin-denies-American-reports-of-Iranian-missile-transfers.

²³² "Iran Continues to Deny Missile Delivery to Russia as Ukraine Warns It Could Cut Ties with Tehran," *algemeiner*, September 11, 2024, https://www. algemeiner.com/2024/09/11/iran-continues-deny-missile-delivery-russia-ukraine-warns-it-could-cut-ties-tehran/.

²³³ S/2023/975, December 15, 2023.

²³⁴ S/2023/992, December 15, 2023.

the statements and measures taken" by certain countries, which had further "not taken appropriate measures to negate the relevant restrictive measures," and that Iran was left with "no option but to exercise its rights under paragraphs 26 and 36 of the [JCPOA]."²³⁵

On June 3, France, Germany and the United Kingdom sent a letter to the UN Security Council, in order to bring its attention to the actions taken by Iran in violation of Security Council resolutions. In this letter, they pointed to the aforementioned expansion of Iran's stockpile and production of uranium enrichment, the removal of monitoring equipment and the refusal to accept IAEA-appointed inspectors. Three countries also stated that the statements by the Iranian government were contrary to its obligations under the NPT and its commitment under the JCPOA.²³⁶

In response to the letters from these three countries, Iran explained that its actions were in response to the non-compliance with the JCPOA by France, Germany, the United Kingdom and the United States. Iran also explained its decision not to possess nuclear weapons based on its ideological teachings and strategic considerations.²³⁷ Russia criticized the letter, saying, "[Russia] considers the above-mentioned letter another attempt by these States members of the Joint Comprehensive Plan of Action to mislead the Security Council as well as to divert attention from their own numerous violations of resolution 2231 (2015) and shift the responsibility to Iran for the crisis around the nuclear deal and the stagnation of the negotiations on its restoration."²³⁸

China, Iran and Russia issued a joint statement at the IAEA Board of Governors meeting on June 4, claiming:²³⁹

- France, Germany and the UK as well as the United States, despite their promises, chose a different course of action, foregoing our shared goal of resumption of the JCPOA implementation for the sake of their own political considerations;
- While recalling paragraph 8 of the UNSCR 2231, we emphasize that after the time frames envisaged in the JCPOA and UNSCR 2231, the Iranian nuclear program will be treated in the same manner as that of any other nonnuclear weapon state party to the NPT; and
- [China, Iran and Russia] are convinced that it is time for Western countries to

²³⁵ S/2024/476, June 19, 2024.

²³⁶ S/2024/429, June 3, 2024.

²³⁷ S/2024/439, June 6, 2024.

²³⁸ S/2024/467, June 19, 2024.

²³⁹ "Joint Statement on behalf of the People's Republic of China, the Islamic Republic of Iran and the Russian Federation under the agenda item 6 of the session of the IAEA Board of Governors "Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231 (2015)," Vienna, June 4, 2024," Ministry of Foreign Affairs of the Russian Federation, June 6 ,2024, https://www.mid.ru/en/foreign_policy/international_organizations /1954844/.

demonstrate political will, restrain themselves from the endless wheel of escalation that they have been spinning for the past almost two years and take the necessary step towards the revival of the JCPOA. There is still a possibility to do so.

On December 12, 2024, a new report on the implementation of UN Security Council Resolution 2231 for 2024 was issued by the UN Secretary-General. Referring to the IAEA report and letters submitted by various countries, it stated the following:²⁴⁰

Since my previous report, the regional context surrounding the Joint Comprehensive Plan of Action has further deteriorated, underscoring the critical need for a peaceful solution to the Iranian nuclear issue. The United States of America has not returned to the Plan of Action, nor has it lifted or waived the unilateral sanctions reimposed after its withdrawal from the Plan on 8 May 2018. It has also not extended the waivers with regard to the trade in oil with the Islamic Republic of Iran. The Islamic Republic of Iran has not reversed any of the steps away from its nuclear-related commitments that it has taken since May 2019, following the withdrawal of the United States from the Plan. As we enter the final year of implementation of resolution 2231 (2015), I urge participants in the Joint Comprehensive Plan of Action and the United States to remain committed to a diplomatic

solution for restoring the objectives of the Plan.

Nuclear-related cooperation between concerned states

There have been repeated allegations over the years that North Korea and Iran have engaged in nuclear and missile development cooperation. The report by the Panel of Experts on North Korea in March 2021 mentioned that North Korea and Iran had resumed cooperation on long-range missile development projects.²⁴¹ However, subsequent reports published by the Panel in 2022 and 2023 did not contain any references regarding cooperation between North Korea and Iran in this area. Meanwhile, no concrete evidence has been revealed to support allegations of nuclear-related cooperation between North Korea and Iran. Iran conducted a drone and missile attack against Israel on April 13, 2024. South Korea's National Intelligence Agency stated that it was closely monitoring whether the missile used in the attack contained North Korean technology, given past missile cooperation between Iran and North Korea.²⁴²

D) Participation in the PSI

A total of 106 countries—including 21 member states of the Operational Expert Group (Australia, Canada, France, Germany, Japan, South Korea, the Netherlands, New Zealand, Norway,

²⁴⁰ S/2024/896, December 12, 2024.

²⁴¹ S/2021/211, March 4, 2021.

²⁴² "NIS Monitoring Possible Use of N. Korea's Weapons Technology for Iran's Attack on Israel," *Yonhap News Agency*, April 17, 2024, https://en.yna.co.kr/view/AEN20240417006300315.

Poland, Russia,²⁴³ Turkey, the United Kingdom, the United States and others) as well as Israel, Kazakhstan, Saudi Arabia, Sweden, Switzerland and others—have expressed their support for the principles and objectives of the Proliferation Security Initiative (PSI). Many of them have also participated and cooperated in PSI-related activities.

The interdiction activities actually carried out within the framework of the PSI are often based on information provided by intelligence agencies; therefore, most of them are classified. In the meantime, participating states have endorsed the PSI statement of interdiction principles and endeavored to reinforce their capabilities for interdicting WMD through exercises and outreach activities.

On September 24-27, 2024, an Asia-Pacific interdiction exercise, "Pacific Protector 24," was held in Australia. This exercise was the tenth in a series of rotational training exercises in the Asia-Pacific region, as decided at PSI's 10th anniversary meeting in 2013, and was conducted by five countries (Australia, Japan, South Korea, Singapore, and the United States).

In January-February 2024, the United States and Morocco co-hosted a PSI Africa political meeting and outreach event in Marrakech. The U.S. Department of States explained about the meeting as following:

At the meeting – the largest PSI event ever held on the African Continent - the United States, Morocco, and 11 other PSI-endorsing countries engaged 22 African countries that had not yet endorsed the PSI to explain the purpose and importance of the Initiative in countering the threats from the trafficking in weapons of mass destruction (WMD) and related items in the region. Over three days, more than 150 civilian and military leaders from 35 governments examined modern WMD proliferation pathways, improved understanding of WMD interdiction obligations, explored legal frameworks and the best practices of partners, and enhanced the growth and connectivity of the counterproliferation community in Africa.244

Japan's Maritime Self-Defense Force destroyers and patrol aircraft have been conducting vigilance monitoring activities in the Sea of Japan and Yellow Sea since December 2017 against activities in violation of Security Council resolutions at sea, including seizures by North Korea, and the seizures are posted on the Ministry of Foreign Affairs website.²⁴⁵ The surveillance activities continued in 2024, and in addition to Japan and the United States, Australia, Canada, France, Germany, Italy, the Netherlands, New

²⁴³ Russia has suspended its participation since 2022.

²⁴⁴ "Proliferation Security Initiative African Political Meeting and Outreach Event," U.S. Department of States, February 2, 2024, https://2021-2025.state.gov/proliferation-security-initiative-african-political-meeting-and-outreach-event/.

²⁴⁵ Ministry of Foreign Affairs, "Suspected Illegal Transshipment of Goods at Sea by North Korea-related Vessels," November 15, 2023, https://www.mofa.go.jp/mofaj/fp/nsp/page4_003679.html. ()

Zealand, and the United Kingdom have participated so far.

Although not a PSI participant, India reported in January 2024 that its security agencies had intercepted a ship bound for Karachi from China at Mumbai's Nhava Sheva port on suspicion that it was carrying general-purpose goods that could lead to Pakistan's nuclear and ballistic missile programs.²⁴⁶

E) Civil nuclear cooperation with nonparties to the NPT

In September 2008, the NSG agreed to grant India a waiver allowing nuclear trade with the member states under the condition that India made commitments, including conclusion of the IAEA Additional Protocol and continuation of the nuclear test moratorium. Since then, some countries have sought to engage in civil nuclear cooperation with India, and several countries, including Australia, Canada, France, Japan, Kazakhstan, South Korea, Russia and the United States, have concluded bilateral civil nuclear cooperation agreements with India.

Actual nuclear cooperation with India under these agreements has been sparse,²⁴⁷ with the exception of India importing uranium from Australia, Canada, France, Kazakhstan and Russia, and the conclusion of its agreements to import uranium from Argentina, Mongolia, Namibia and Uzbekistan.²⁴⁸ On the other hand, informal talks between Russian and Indian leaders in July 2024 reportedly discussed the implementation of a project to build an uninstalled nuclear reactor at the Kulam Nuclear Power Plant in Koh Kong, as well as the joint production of power plant components.²⁴⁹ In addition, despite the United States' ongoing support for India's membership in the NSG,²⁵⁰ India has yet to be admitted to it.

Meanwhile, China has been criticized for its April 2010 agreement to export two nuclear power reactors to Pakistan, an act which may violate the NSG guidelines. China has claimed an exemption for this transaction under the "grandfather clause"

²⁴⁶ "Once Again, Concerns Arise About China-Pakistan WMD Nexus," *The Diplomat*, March 8, 2024, https://thediplomat.com/2024/03/nuclear-proliferation-surfaces-again-as-india-intercepts-pakistan-bou nd-dual-use-items/.

²⁴⁷ "No New Power Projects from Indo-US Nuclear Deal," *The Pioneer*, March 9, 2020, https://www. dailypioneer.com/2020/india/no-new-power-projects-from-indo-us-nuclear-deal.html.

²⁴⁸ Adrian Levy, "India Is Building a Top-Secret Nuclear City to Produce Thermonuclear Weapons, Experts Say," *Foreign Policy*, December 16, 2015, http://foreignpolicy.com/2015/12/16/india_ nuclear_city_top_secret_china_pakistan_barc/; James Bennett, "Australia Quietly Makes First Uranium Shipment to India Three Years after Supply Agreement," *ABC*, July 19, 2017, https://www.abc.net.au/news/2017-07-19/australia-quietly-makes-first-uranium-shipment-to-india/ 8722108; Dipanjan Roy Chaudhury, "India Inks Deal to Get Uranium Supply from Uzbekistan," *Economic Times*, January 19, 2019, https://econ omictimes.indiatimes.com/news/defence/india-inks-deal-to-geturanium-supply-from-uzbekistan/article show/67596635.cms.

²⁴⁹ "India and Russia explore further nuclear energy projects," *World Nuclear News*, July 10, 2024, https://www.world-nuclear-news.org/articles/india-and-russia-explore-further-nuclear-energy-pr.

²⁵⁰ Srinivas Laxman, "US Reiterates Support for India's Inclusion in Nuclear Suppliers Groups," *The Times of India*, June 24, 2023, https://timesofindia.indiatimes.com/india/us-reiterates-support-for-indias-inclusion-in-nuclear-suppliers-group/articleshow/101225911.cms.

of the NSG guidelines (i.e. it was not applicable at the time China became an NSG participant after the start of negotiations on the supply of the reactors). China will also supply enriched uranium to Pakistan for operating these reactors.²⁵¹ Because all other Chinese reactors that were claimed to be excluded from NSG guidelines under the grandfather clause were built at Chashma, there remains a question as to whether or not the exemption can also apply to the Karachi plant. In June 2023, Pakistan and China signed a \$4.8 billion deal to build the seventh Chinese nuclear power plant in Pakistan.²⁵²

The NAM has criticized civil nuclear cooperation with non-NPT states, arguing as follows:

The Group of Non-Aligned States Parties to the Treaty emphasizes that nonproliferation must be pursued and implemented, without exception, through the strict observance of, and adherence to, IAEA comprehensive safeguards and to the Non-Proliferation Treaty as a condition for any cooperation in the nuclear area with States not parties to the Treaty. In view of the Group, new supply arrangements for the transfer of source or special fissionable material or equipment or material especially designed or prepared for the processing, use or production of special fissionable material to non-nuclear-weapon States should require, as a necessary precondition, acceptance of IAEA full-scope safeguards and internationally legally binding commitments not to acquire nuclear weapons or other nuclear explosive devices.²⁵³

Egypt made the following statement in its national statement at the 2024 NPT PrepCom:

[W]e have regrettably witnessed actions by some states parties that lead to the opposite direction by providing incentives and exemptions for nuclear cooperation with states that have not acceded to the Treaty. Such actions further undermine the Treaty's relevance and credibility and violate previously agreed commitments. The conference must once again reaffirm that acceptance of IAEA comprehensive safeguards is a prerequisite for any nuclear supply arrangements.²⁵⁴

(6) Transparency in the Peaceful Use of Nuclear Energy

A) Efforts for transparency

In addition to accepting IAEA full-scope

²⁵¹ "Pakistan Starts Work on New Atomic Site, with Chinese Help," *Global Security Newswire*, November 27, 2013, http://www.nti.org/gsn/article/pakistan-begins-work-new-atomic-site-being-built-chinese-help/.

²⁵² Ayaz Gul, "Pakistan Signs \$4.8 Billion Nuclear Power Plant Deal with China," *Voa News*, June 20, 2023, https://www.voanews.com/a/pakistan-signs-4-8-billion-nuclear-power-plant-deal-with-china/714 4967.html.

²⁵³. NPT/CONF.2026/PC.2/WP.25, June 26, 2024. Meanwhile, examining the individual statements from the NAM countries, it is noticeable that some of these countries highlight and express criticism towards nuclear cooperation, particularly involving Israel, while they appears to be an absence of criticism regarding the nuclear cooperation between China and Pakistan.

²⁵⁴ "Statement by Egypt," Cluster 2 Nuclear Non-Proliferation, Second PrepCom for 11th NPT PevCon, July 26, 2024.

safeguards, as described earlier, NNWS should aim to be fully transparent about their nuclear-related activities and future plans, in order to demonstrate that they have no intention of developing nuclear weapons. Every state that concludes an Additional Protocol with the IAEA is obliged to provide information on its general plans for the next ten-year period relevant to any nuclear fuel cycle development (including nuclear fuel cyclerelated research and development activities). Most countries that actively promote the peaceful use of nuclear energy have issued mid- or long-term nuclear development plans, including for the construction of nuclear power plants.²⁵⁵ The international community may be concerned about the possible development of nuclear weapon programs when states conduct nuclear activities without publishing their nuclear development plans (as has happened with Israel, North Korea and Syria, for example), or that engaged in nuclear activities which seem inconsistent with their plans (e.g., allegedly, Iran).

From the standpoint of transparency, communications received by the IAEA from certain member states concerning their policies on the management of plutonium, including the amount of plutonium they held, are also important. Using the format of the Guidelines for the Management of Plutonium (INFCIRC/549) agreed in 1997, the five NWS plus Belgium, Germany, Japan and Switzerland publish data annually on the amount of civil unirradiated plutonium under their control. As of December 2024, however, China has not submitted a report since 2018. France and Germany reported their holdings not only of civil plutonium but also of HEU.²⁵⁶ The United Kingdom and the United States also report annually, but their 2024 reports were not released by the end of 2024.

Japan's report submitted to the IAEA was based on the annual report, titled "The Current Situation of Plutonium Management in Japan," released on July 16, 2024, by the Japan Atomic Energy Commission (JAEC).²⁵⁷

China has not disclosed details about the two reprocessing plants under construction, nor has it clearly stated that it does not intend to divert the two fast breeder reactors under construction to military purposes. Japan has in recent years, presumably with China in mind, called for maintaining transparency in civilian plutonium management and noted the importance of implementing the Guidelines for Plutonium Management

²⁵⁵ The World Nuclear Association's website (http://world-nuclear.org/) provides summaries of the current and future plans of civil nuclear programs around the world.

²⁵⁶ IAEA, "Communication Received from Certain Member States Concerning Their Policies Regarding the Management of Plutonium," https://www.iaea.org/publications/documents/infcircs/communicati on-received-certain-member-states-concerning-their-policies-regarding-management-plutonium.

²⁵⁷ Office of Atomic Energy Policy, Cabinet Office of Japan, "The Status Report of Plutonium Management in Japan — 2023," July 16, 2024, https://www.aec.go.jp/bunya/04/plutonium/2024071 6_e.pdf.

(INFCIRC/549).²⁵⁸ At the NPT PrepCom, the NPDI stated in its working paper, "the Non-Proliferation and Disarmament Initiative underscores the importance of the implementation of the Guidelines for the Management of Plutonium (INFCIRC/549), a transparency measure welcomed by NPT States Parties in 2000, and calls upon all States that committed to reporting annually their holdings of all plutonium in peaceful nuclear activities to fulfil those commitments. Such concrete efforts could also be included in reporting."²⁵⁹

Other NNWS surveyed in this *Hiroshima Report* have either publicized the amount of their fissile material holdings, or at least have placed their declared nuclear material under IAEA safeguards. This allows the conclusion that these states have shown clear evidence of transparency with regard to their civil nuclear activities.

B) Multilateral approaches to the fuel cycle

Several countries have sought to establish multilateral approaches to the fuel cycle, including nuclear fuel banks, as one way of dissuading NNWS from adopting indigenous enrichment technologies. Austria, Germany, Japan, Russia, the United Kingdom, the United States and the EU, as well as six countries acting jointly (France, Germany, the Netherlands, Russia, the United Kingdom and the United States), have made their respective proposals.

Among those proposals, nuclear fuel banks have made actual and concrete progress. Subsequent to the establishment of the International Uranium Enrichment Centre (IUEC) in Angarsk (Russia) and the American Assured Fuel Supply, the IAEA LEU Bank in Kazakhstan was inaugurated and in August 2017.²⁶⁰ The IAEA LEU Bank was funded mainly by the Nuclear Threat Initiative (NTI), Kuwait, Norway, the UAE, the United States and the EU.²⁶¹

²⁵⁸ See, for example, "Statement by Japan," First PrepCom for the 11th NPT RevCon, July 31, 2023; "G7 Leaders' Hiroshima Vision on Nuclear Disarmament," May 19, 2023.

²⁵⁹ NPT/CONF.2026/PC. II/WP.32, July 2, 2024.

²⁶⁰ In NTP's original proposal for a nuclear fuel bank, one of the conditions for providing fuel was that the country must have renounce the possession of facilities related to nuclear fuel cycle. However, such a condition was not included for neither the Russian center nor the Kazakhstan fuel bank.

²⁶¹ Approximately \$150 million in funds were allocated for establishment and operation for the next 20 years.

Chapter 3

Nuclear Security¹

(1) Physical Protection of Nuclear Materials and Facilities

According to the International Atomic Energy Agency (IAEA), nuclear security means "the prevention of, detection of, and response to, criminal or intentional unauthorized acts involving or directed at nuclear material, other radioactive material, associated facilities, or associated activities."² The scope of nuclear security primarily concerns the theft of nuclear materials and other radioactive materials as well as sabotage against related facilities by non-state actors.

A) Nuclear materials

Weapon-usable nuclear fissile materials, namely highly enriched uranium (HEU)³ and separated plutonium, are generally thought to be attractive to those who have malicious intent, such as terrorists looking to produce nuclear explosive devices. In this regard, the amounts of these materials in a country as well as the number of facilities that contain such materials are considered to be among the important indicators for assessing that state's efforts in enhancing nuclear security. According to various publicly available data, the amount of weaponsusable nuclear fissile materials possessed by the countries surveyed in this report is shown in Tables 3-1 and 3-2 respectively.

Although the estimated amount of HEU and separated plutonium possessed by each country is highly uncertain as it is mostly based on estimates, in 2024, the total quantity of these materials worldwide seems to have increased from the previous year's 1,806 tons to 1,819.68 tons. In addition to an increase in separated plutonium holdings as in the previous year, there was also an increase in HEU holdings.

The total amount of HEU increased to 1,256.3 tons from 1,248 tons in the previous year. In particular, for military use, India and Pakistan increased their holdings by 0.8 and 0.2 tons compared with the previous year. India is believed to continue to be producing HEU for naval propulsion (fuel for nuclear powered submarines).⁴

As for civilian use, the 13 Non-Nuclear Weapon States, including the countries in this survey, increased their nuclear fissile material inventories from 4 tons in the previous year to 15 tons. This increase is due to a change in the calculation method by the organization which complies the

¹ This chapter is authored by Masahiro Okuda and Junko Horibe.

² IAEA, "Nuclear Security Series Glossary Version 1.3 (November 2015) Updated," p. 18. Regarding targets of nuclear security threat and risk scenarios, see *Hiroshima Report 2023* edition, p. 134.

 $^{^3}$ The material that can be used for nuclear weapons typically includes HEU with an enrichment level 20 % or higher. The majority of military-grade HEU is estimated to have an enrichment level exceeding 90 %.

⁴ SIPRI Yearbook 2024: Armaments, Disarmament and International Security, Stockholm International Peace Research Institute, Oxford University Press, 2024, p. 361.

Country	Military (Tons)	Non-military (Tons)	Total Amount
China	14.0	0.0 **	14.0
France	25.0	5.369	30.3
Russia	672.0	8.0	680.0
United Kingdom	21.9	0.7	22.6
United States	450.4	32.6	483.0
India	5.3	0.0**	5.3
Israel	0.3	0.02	0.32
Pakistan	5.1	0.02	5.12
North Korea	0.7		0.7
Others*		15.0***	15.0
(Non-nuclear weapon			
states)			
Total Amount	1,194.7	61.6	1,256.3

Table 3-1 Highly Enriched Uranium Holdings

This table was created by the author based on the data mainly from Nagasaki University Research Center for Nuclear Weapons Abolition (RECNA) "Global Nuclear Material Data 2024," (data as of the end of 2022) and INFCIRC documents.

* Others: 13 countries, including 10 under this survey (Australia, Belgium, Canada, Germany, Iran, Japan, Kazakhstan, the Netherlands, Norway and South Africa).

** Inventory is less than 100 kilograms, but details are unknown.

*** Figure from RECNA's "Global Nuclear Material Data 2024." It noted that "according to the IAEA Annual Report for 2022, 3.9 tons was the amount obtained from back-calculation based on the total inventory of U235 under safeguards (159 significant quantities (U235: 25kg)), and the value has been adopted by the IPFM (2023). In fact, if the 100% enriched HEU is 3.9 tons then the 20% enriched HEU is 19.5 tons. Due to the fact that the average enrichment rate is unknown, the accurate amount is "between 3.9 to 19.5 tons." RECNA has decided to return to the figure shown by the IPFM in 2019 (15 tons). However, the details have not been disclosed, so the figure is uncertain."

Source: RECNA "Global Nuclear Material Data 2024"; International Panel on Fissile Material (IPFM), "Materials: Highly enriched uranium," April 13, 2024, https://fissilematerials.org/materials/heu.html; INFCIRC/549/Add.5-28, August 23, 2024 (France).

data cited (for details, see note in Table 3-1). As described later, some of countries surveyed are making efforts to reduce the amount of HEU stockpiles (see (3)A) in this chapter).

Iran continues to produce HEU for claimed civilian purposes. According to an IAEA report published in November 2024, as of October 26 of the same year, it is estimated that Iran possessed 182.3 kg of uranium hexafluoride with an enrichment level of approximately 60%, an increase of 54 kg since the previous report was written.⁵ On the other hand, civilian use HEU decreased by 0.05 tons in France and 1.3 tons in the United States.

It should be noted that although 34 countries and Taiwan once had HEUs for civilian use, they have completely eliminated their civilian HEU through the Global Threat Reduction Initiative (GTRI) and other initiatives promoted by the United States. Such HEU minimization efforts (see (3)A) of this Chapter) continue to be underway contributing to a downward trend in the global stockpile of HEU. On the other

⁵ IAEA, "Verification and Monitoring in the Islamic Republic of Iran in Light of United Nations Security Council Resolution 2231 (2015) Report by the Director General," GOV/2024/61, November 19, 2024, p. 9.

Country	Military (Tons)	Non-military (Tons)	Total Amount
China	2.9	0.04	2.94
France	6.0	96.25**	102.25
Russia	88.0	104.5	192.5
United Kingdom	3.2	116.4	119.6
United States	38.2	49.2	87.4
India	9.9	0.4	10.3
Israel	0.85		0.85
Pakistan	0.5		0.5
		44.5**	44.5
Japan		(35.8 tons of which are held	
		overseas)	
North Korea	0.04		0.04
Others*		2.5***	2.5
Total Amount	149.59	413.79	563.38

Table 3-2 Separated Plutonium Holdings

This table was created by the author based on the data from RECNA "Global Nuclear Material Data 2024," (data as of the end of 2022) and INFCIRC documents.

* Holdings of Belgium, Germany, Switzerland, and Spain in foreign countries.

** Data from INFCIRC/549.

(Quotes from the RECNA website) "The stockpile of fissile materials includes estimated ones with large uncertainties and thus total quantities are expressed in rounded numbers. The figures are shown to the second decimal point for North Korea only, although the amount is 100 kg or less, in order to show that it does possess the material. Chinese inventory was as of the end of 2016, and no data has been published since then.

Military: Plutonium used in nuclear warheads or stored for use in weapons; plutonium that is reserved for possible military uses in the future.

Non-military: Plutonium separated from spent nuclear fuel from a nuclear reactor for non-military purposes; plutonium declared as surplus for nuclear weapons."

Sources: Nagasaki University Research Center for Nuclear Weapons Abolition, "Global Nuclear Material Data 2024," INFCIRC/549/Add.3.23, May 23, 2024(Belgium); INFCIRC/549/Add.5/28, August 23, 2024 (France); INFCIRC/549/ Add.1/27, September 6, 2024 (Japan); INFCIRC/549/Add.4/28, January 24, 2024 (Switzerland); "Materials: Plutonium," *IPFM Blog*, April 13, 2024, https://fissilematerials.org/materials/plutonium.html.

hand, approximately 95% of the world stocks of HEU are dedicated to military purposes. Thus, ensuring the nuclear security of not only civilian but also military-use HEU remains critically important.

With respect to separated plutonium, for military use, the stockpile of the United States decreased by 0.2 tons. On the other hand, India's estimated stockpile increased by 0.7 tons and Israel's estimated stockpile increased by 0.05 tons compared to last year. For civilian use, while Japan's stockpile decreased by 0.6 tons and that of the United Kingdom decreased by 0.3 tons.⁶ France's stockpile increased significantly to approximately 4 tons and Russia's increased 1 ton. The global inventory of this material as a whole has been on an increasing trend in recent years.

B) Radioactive materials

Since the September 11, 2001 terrorist attacks in the United States, the threat of

⁶ "Japan Atomic Energy Commission's Views on Plutonium Utilization Plans Announced by Electric Power Companies and the Japan Atomic Energy Agency," Japan Atomic Energy Commission, February 27, 2024. https://www.aec.go.jp/kettei/seimei/kenkai/20240227_e.pdf.

radioactive dispersal devices (so-called "dirty bombs") has become a concern. Therefore, not only nuclear materials, but also other radioactive materials are included in the scope of nuclear security efforts. Among them, radioactive sources are widely used around the world in various fields ranging from medicine to agriculture. Since those materials are generally stored in locations where protection is not as stringent as for weapons-usable nuclear materials, the risk of theft is relatively high, and it is necessary to further strengthen international efforts for the security of those material.

An important international document related to nuclear security of radioactive sources is the Code of Conduct on the Safety and Security of Radioactive Sources (hereafter referred to the "Code"), which was adopted at the IAEA Board of Governors in September 2003.⁷ While this is not a legally binding document, as of June 2024, 151 countries, including all of the countries included in this survey except Iran and North Korea, have made a political commitment to implement it. Also, 138 out of 151 countries had notified the IAEA Director General of their intention to act in a harmonized manner in accordance with the Code's Supplementary Guidance

document on the Import and Export of Radioactive Sources. Seventy countries did the same for the Guidance document on the Management of Disused Radioactive Sources.⁸

Among the surveyed countries that have expressed political commitment to the Code, as of October 30, 2024 their actions pertaining to those supplementary documents vary.

For example, for the Supplementary Guidance on the Import and Export of Radiation Sources, all countries have registered their own contact organizations, but in some cases, there were countries that have not made a commitment to this Guidance document or responded to the questionnaire requested by the IAEA. Regarding the Supplementary Guidance on the Management of Disused Radioactive Sources, some countries still have not made any commitments.⁹

During the survey period, South Africa received support from the IAEA for the development of national legislation and regulatory frameworks.¹⁰ In 2024, Japan received a review of the security of radioactive materials for the first time in the International Physical Protection Advisory Service (IPPAS) mission, an IAEA international peer review mission. In Japan, the Security Regulations for

¹⁰ IAEA, Nuclear Security Report 2024, p. 6.

⁷ The main objectives of this Code of Conduct are to achieve a high level of safety and security of radioactive sources; to deter unauthorized access, theft, and unauthorized transfer of radioactive sources, thereby causing harmful effects on individuals, society, and the environment; and to minimize radiation effects caused by accidents and malicious acts.

⁸ IAEA, Nuclear Security Report 2024, GOV/2024/35-GC(68)/7, September 2024, pp. 14-15.

⁹ "List of States," IAEA, October 30, 2024. https://nucleus.iaea.org/sites/ns/code-of-conduct-radioact ive-sources/Documents/Status_list% 2030%20October%202024.pdf.

Specified Radioactive Isotopes came into force in September 2019.¹¹ In February 2024, Mexico hosted a regional meeting organized by the IAEA to share experiences on implementing the Code and its supplementary documents.¹²

As for the United States, in its report to the Congress on nuclear threat reduction, the Department of Energy's National Nuclear Security Administration (NNSA) reported that they eliminated 82 domestic and 19 international high activity radioactive devices and recovered over 2,600 radioactive sources domestically and 16 internationally in the fiscal year 2023.¹³

The Co-president of the IAEA International Conference on Nuclear Security in Vienna, May 2024 (here after ICONS2024) stated that "we commit to maintaining effective security of radioactive sources throughout their life cycle, consistent with the objectives of the Code of Conduct on the Safety and Security of Radioactive Sources and its supplementary guidance documents."¹⁴

The G7 encouraged further political commitment to this Code and its supplementary guidance documents and

their implementation in a statement issued in April by the Non-Proliferation Directo's Group (NPDG).¹⁵

C) Nuclear facilities Facilities

Nuclear facilities that could potentially have serious radiological consequences in the event of sabotage include power reactors, research reactors, uranium enrichment facilities, reprocessing facilities, and spent fuel as well as radioactive waste storage facilities. Of these, 439 (+3) power reactors worldwide were operational in 31 countries plus Taiwan as of November 11, 2024, 66 (+4) were under construction, 87 (-24) were in the planning stage, and 344 (-26) were proposed for construction (changes from the previous year in parentheses).¹⁶ However, the data is updated from time to time so the figures are subject to change.

In recent years, there has been a growing interest in nuclear power generation from the perspective of countering global warming and energy security. Currently, about 30 countries are considering, planning, or newly starting nuclear power programs, and another 20 countries have

¹¹ "Overview of Nuclear Security Regulatory Framework in Japan, IPPAS Preparatory Meeting," Nuclear Regulation Authority; https://www2.nra.go.jp/data/000453239.pdf.

¹² IAEA, Nuclear Security Report 2024, p. 15.

¹³ National Nuclear Security Administration, Prevent, Counter, and Respond—NNSA's Plan to Reduce Global Nuclear Threats FY2025-FY 2029, September 2024, p. 2-2, https://www.energy.gov/sites/default/files/2024-10/FY25%20NPCR.pdf.

¹⁴ "Statement by the Co-Presidents of the International Conference on Nuclear Security 2024: Shaping the Future," https://www.iaea.org/sites/default/files/24/05/cn-321_co-presidents_statement.pdf.

¹⁵ "Statement of the G7 Non-Proliferation Directors Group," Ministry of Foreign Affairs of Japan, April 18, 2024.

¹⁶ "World Nuclear Power Reactors & Uranium Requirements," World Nuclear Association, November 4, 2024, https://world-nuclear.org/information-library/facts-and-figures/world-nuclear-power-reactors-and-uranium-requireme.aspx.

expressed some form of interest.¹⁷

Under such circumstances, China and Russia have come to account for a significant share of the international market for nuclear power plant (NPP) exports. As of December 2024, according to the World Nuclear Association, China is expected to export NPPs to 12 countries. In addition to traditional cooperation partners such as Pakistan, these countries include in the Middle East and Africa, such as Kenya, Sudan, and Egypt.¹⁸ Russia is currently constructing NPPs in six countries, and is also in talks with 13 other countries, including Egypt, Bangladesh and Uzbekistan, which are introducing NPP.¹⁹

¹⁷ "Emerging Nuclear Energy Countries," World Nuclear Association, April 26, 2024, https://world-nuclear.org/information-library/country-profiles/others/emerging-nuclear-energy-countries.

¹⁸ "Nuclear Power in China," World Nuclear Association, November 19, 2024, https://world-nuclear.org/information-library/country-profiles/countries-a-f/china-nuclear-power.

¹⁹ "Nuclear Power in Russia," World Nuclear Association, September 7, 2024, https://world-nuclear.org/information-library/country-profiles/countries-o-s/russia-nuclear-power.

	Nuclear Power Plant(s)	Research Reactor(s)	Uranium Enrichment Facility/Facilities	Reprocessing Facility/Facilities
China	0	0	⊖(b)	0
France	0	0	0	0
Russia	0	0	0	○(b)
U.K.	0	0	0	\bigtriangleup
U.S.	0	0	0	0
India	0	0	○(a)	○(b)
Israel		0		○(a)
Pakistan	0	0	\bigcirc (a)	○(a)
Australia		0		
Belgium	0	0		
Brazil	0	0	0	
Canada	0	0		
Finland	0	\triangle (d)		
Germany	0	0	0	
Iran	0	0	0	
Japan	0	0	0	\triangle (e)(d)
Kazakhstan	\triangle (d)	0		
South Korea	0	0		
Mexico	0	0		
Netherlands	0	0	0	
Norway		\triangle (d)		
South Africa	0	0		
Sweden	0	\triangle (d)		
Switzerland	0	0		
Turkey	\triangle (c)	0		
UAE	0			
North Korea		○(a)	0	○(a)

Table 3-3: Nuclear facilities

 \bigcirc :Currently in operation \triangle : Not-in operation (a) Military use (b) Military and civilian use (c) Under construction (d) Under shut down and decommissioning (e) Under test operation.

Sources: IAEA, Power Reactor Information System, https://pris.iaea.org/pris/; IAEA, Research Reactor Database, https://nucleus.iaea.org/RRDB/RR/ReactorSearch.aspx?filter=0; "Facilities: Enrichment facilities," IPFM, April 13, 2024; "Facilities: Reprocessing Plants," International Panel on Fissile Materials, April 13, 2024; "Yongbyon Nuclear Scientific Research Center: An Overview of Changes at the Uranium Enrichment and Conversion Facilities," 38 North, November 2, 2023, https://www.38north.org/2023/11/yongbyon-nuclear-scientific-research-center-an-overview-of-changes-at-the-uranium-enrichment-and-conversion-facilities/.

As for research reactors, as of November 2024, there were 844 units (+4) worldwide, in 71 countries, broken down

as follows:²⁰

- ➢ Operational: 227 units (+2)
- Temporary shutdown: 7 units (-2)
- Under construction: 11 units (+4)
- Planned: 1 unit (-1)
- Extended shut-down: 12 units (± 0)

- \blacktriangleright Permanent shut-down: 55 units (±0)
- Decommissioned: 451 units (+1)
- Currently being dismantled: 69 units (±0)

(Figures in parentheses represent changes from the previous year)

Looking at HEU spent fuel assemblies for research reactors, there are 20,736 assemblies worldwide with an enrichment

²⁰ IAEA, "Research Reactor Database," https://nucleus.iaea.org/rrdb/#/home.

of more than 20%.²¹ Of these, 9,483 have an enrichment of 90% or more, a decrease of 99 since last year. By region, there are 11,003 in Eastern Europe, 4,215 in Western Europe, 1,704 in the Far East, 1,623 in North America, 433 in Africa, 223 in the Middle East and South Asia, 1,450 in Southeast Asia and the Pacific, and 85 in Latin America.²² This worldwide presence of such a large number of HEU spent fuel assemblies indicates the continued importance of strengthening measures to prevent the theft of HEU at research reactor facilities.

Uranium enrichment and reprocessing facilities are considered to be the most attractive nuclear facilities for terrorists seeking to produce nuclear explosive devices because of the availability of nuclear materials that can be directly used for such devices. Table 3-3 shows the status of nuclear power reactors, research reactors, uranium enrichment facilities, and reprocessing facilities in the surveyed countries for the *Hiroshima Report*.

Risks posed by emerging technologies

Unmanned aerial vehicle (Drone)

Regarding sabotage against nuclear facilities, as reported in previous issues of

Hiroshima Report, there have been quite a few relevant incidents involving unmanned aerial vehicles (UAV), also known as drones. While drones are increasingly used at NPP for inspection, monitoring, and survey purposes, there are concerns about the threat to nuclear security. Although nuclear facilities are robustly protected buildings and direct drone strikes are unlikely to cause serious radiological consequences, some of the characteristics of drones such as the rapid pace of technological improvement and evolution as well as low cost and availability require careful monitoring of their risk trends.

In November 2024, the IAEA published a technical guidance document entitled Identification and Categorization of Sabotage Targets, and Identification of Vital Areas at Nuclear Facilities (IAEA Nuclear Security Series No. 48-T).²³ This publication provides detailed guidance for regulatory authority of member states and operators of associated facilities to identify potential sabotage targets in a nuclear facility and possible vulnerabilities. This document mentioned two types of attack scenarios sabotage by intrusion and attack from outside of the facility boundary. The latter includes attacks using drones and missiles.²⁴

²¹ IAEA, "Worldwide HEU and LEU Assemblies by Enrichment," https://nucleus.iaea.org/rrdb/#/ reports/summary-report/WorldwideHEUandLEUassembliesbyEnrichment.

²² IAEA, "Regionwise Distribution of HEU and LEU," https://nucleus.iaea.org/rrdb/#/reports/ summary-report/RegionwisedistributionofHEUandLEU.

²³ "Identification and Categorization of Sabotage Targets, and Identification of Vital Areas at Nuclear Facilities," IAEA, November 2024, https://www.iaea.org/publications/15623/identification-and-categorization-of-sabotage-targets-and-identification-of-vital-areas-at-nuclear-facilities.

²⁴ Ibid. p. 5.

Cyberattacks

In addition to these potential threats to nuclear facilities from UAVs, cyber threats are also becoming more diverse and complex, and dealing with them is a major challenge, even for those that are more technologically advanced. While digitization offers convenience and benefits, there is concern that reliance on digital components of safety and physical protection systems in nuclear facilities may increase cyber risks. Cyberattacks on those systems could also be used to facilitate theft of nuclear material or sabotage leading to the release of radioactive materials.²⁵ These concerns are being shared by many countries, and there is a growing demand for support in this area even among IAEA member states.²⁶ The IAEA provides support by holding training courses related to regulatory systems, incident responses, and assessments. According to the IAEA's Nuclear Security Report 2024, Brazil, France, Germany, Mexico, and Russia, among the countries surveyed, held IAEA training and workshops.²⁷

The co-presidents' statement of ICONS2024 recognized the threat of cyber-attacks at nuclear facilities and other sites and emphasized the need to respond to this risk.²⁸

The IAEA has launched a Coordinated Research Project (CRP) on "Enhancing Computer Security for Small Modular Reactors (SMRs) and Microreactors" (approved in December 2023). This threeyear project will promote the exchange of information and technology among experts from around the world on activities that could improve its nuclear security.²⁹

There were also attempts of cyberattacks against nuclear facilities and cases of regulatory deficiencies at facilities. In the United Kingdom, the company that operates the Sellafield NPP was prosecuted for violating security regulations continuously between 2019 and early 2023, and for having IT systems that were vulnerable to unauthorized access. There was no evidence that vulnerability was exploited, but the company was fined approximately 330,000 pounds for not complying with the nuclear security plan to protect sensitive information.³⁰

Artificial Intelligence (AI)

Alongside the remarkable development of

²⁵ "Outpacing Cyber Threats Priorities for Cybersecurity at Nuclear Facilities," Nuclear Threat Initiative, 2016, p. 10.

²⁶ IAEA, Nuclear Security Review 2024, p. 18.

²⁷ IAEA, Nuclear Security Report 2024, pp. 17-18.

²⁸ "Statement by the Co-Presidents of the International Conference on Nuclear Security 2024: Shaping the Future," https://www.iaea.org/sites/default/files/24/05/cn-321_co-presidents_statement.pdf.

²⁹ "New CRP: Enhancing Computer Security of Small Modular Reactors and Microreactors," IAEA, March 4, 2024, https://www.iaea.org/newscenter/news/new-crp-enhancing-computer-security-of-small-modular-reactors-and-microreactors.

³⁰"Sellafield Fined for Cyber Security Breaches," *BBC*, October 3, 2024, https://www.bbc.com/news/articles/cdd4r7pg3vqo.

AI technologies, both risks and benefits of AI are considered in the context of nuclear security. In this regard, in a report published in June 2024, the Nuclear Security and Safety Group (NSSG) of the G7 expressed concern about the misuse and malevolent use of AI technology. In the report, they state that while AI has the potential to improve and speed up various processes, it could also pose unexpected risks in the near future.³¹ In this regard, the ICONS2024 co-presidents' statement recognized that "emerging and innovative technologies, inter alia artificial intelligence, present potential challenges and benefits."32

The United Kingdom Office for Nuclear Regulation (ONR), the United States Nuclear Regulatory Commission (NRC) and the Canadian Nuclear Safety Commission (CNSC) jointly published a document in September 2024 entitled "Considerations for the Development of Artificial Intelligence Systems in the Nuclear Application." This document describes topics that should be considered when deploying AI to ensure safe and secure operation of nuclear facilities and other uses of nuclear materials. These include reducing the risk of AI errors, regulatory harmonization that respects the regulatory standards of each country, and promoting information sharing and cooperation.³³ In announcing this document, the ONR stated that AI has the potential to contribute to nuclear security and safeguards through data analysis, reducing risks for workers and human errors through supporting human tasks, and that it is also possible to dynamically train and improve AI.³⁴

In November 2024, the U.S. AI Safety Institute established a task force, consists of federal government agencies such as the Department of Commerce and the Department of Energy to examine AI risks. The topics of consideration included radiation and nuclear security.³⁵

D) Armed attacks against nuclear facilities by countries

The attacks and military occupation of Ukrainian nuclear facilities since the Russian invasion in Ukraine in February 2022 raised difficult questions about how to deal with nuclear security threats posed by states. This is beyond the conventional concept of nuclear security, which assumes non-state actors as threats. In 2024, as the fighting intensified, ensuring

³¹ 2024 NSSG Report, G7 Nuclear Safety and Security Group, June 2024, pp. 2-3.

³² "Statement by the Co-Presidents of the International Conference on Nuclear Security 2024: Shaping the Future," https://www.iaea.org/sites/default/files/24/05/cn-321_co-presidents_statement.pdf.

³³ "Considerations for Developing Artificial Intelligence System in Nuclear Applications," September 2024, https://onr.org.uk/media/03zl1osf/canukus_trilateral_ai_principles_paper_2024_08_28-final.pd f.

³⁴ "New Paper's International Considerations for AI in the Nuclear Sector," Office for Nuclear Regulation, September 5, 2024, https://www.onr.org.uk/news/all-news/2024/09/new-paper-shares-international-principles-for-regulating-ai-in-the-nuclear-sector/.

³⁵ "U.S. AI Safety Institute Establishes New U.S. Government Taskforce to Collaborate on Research and Testing of AI Models to Manage National Security Capabilities & Risks," U.S. Department of Commerce, November 20, 2024, https://www.commerce.gov/news/press-releases/2024/11/us-ai-safety-institute-establishes-new-us-government-taskforce.

nuclear safety and nuclear security at nuclear facilities in Ukraine faced multiple difficulties. While the situation at the Zaporizhzhia Nuclear Power Plant (ZNPP) remains the most serious since 2022, other NPPs in Ukraine have also experienced incidents such as the loss of external power supplies due to attacks on energy infrastructure such as electricity substations.

In August 2024, Ukraine began military operations against territory within Russia. These operations led to increased concern about nuclear safety and security of Russia's NPP. In his statement on August 9, the IAEA Director General stated that the 'Seven indispensable pillars to assess the nuclear safety and security situation in Ukraine to the context of the ongoing armed conflict (hereafter, the 'Seven Pillars')"³⁶ and the five concreate principles proposed by the IAEA Director General in 2023 to contribute to ensuring nuclear safety and security at the ZNPP (hereafter, the 'Five Principles')³⁷, which are applicable to the current situation and are important regardless of where the power plant is located.

The following section provides an overview of events in 2024, mainly related to nuclear security at five NPPs in Ukraine, and the responses by the IAEA and others to these events.

Zaporizhzhya Nuclear Power Plant (ZNPP)

Attacks on and around ZNPP occurred frequently in 2024. For instance, on April 7, the ZNPP reported to the IAEA Support and Assistance Mission to Zaporizhzhya NPP (ISAMZ) that drone strike near the laboratory building (LBK-2) inside ZNPP and the port in the northwest of the protected area.³⁸ On the same day, a drone strike on the roof of the reactor dome of ZNPP Unit 6 was

³⁶ 'Seven indispensable pillars to assess the nuclear safety and security situation in Ukraine to the context of the ongoing armed conflict' was developed in March 2022 to evaluate the nuclear safety and security of Ukraine's nuclear facilities under the armed conflict. The 'Seven Pillars' are: 1. The physical integrity of facilities – whether it is the reactors, fuel ponds or radioactive waste stores – must be maintained; 2. All safety and security systems and equipment must be fully functional at all times; 3. The operating staff must be able to fulfill their safety and security duties and have the capacity to make decisions free of undue pressure; 4. There must be a secure off-site power supply from the grid for all nuclear sites; 5. There must be uninterrupted logistical supply chains and transportation to and from the sites; 6. There must be effective on-site and off-site radiation monitoring systems, and emergency preparedness and response measures; and 7. There must be reliable communication with the regulator and others. "Nuclear Safety, Security and Safeguards in Ukraine," IAEA, https://www.iaea.org/topics/response/nuclear-safetysecurity-and-safeguards-in-ukraine.

³⁷ The IAEA Director General proposed "The Five Principles' in May 2023 as principles for protecting the ZNPP and avoiding nuclear incidents. They are: 1. There should be no attack of any kind from or against the plant, in particular targeting the reactors, spent fuel storage, other critical infrastructure, or personnel; 2. The ZNPP should not be used as storage or a base for heavy weapons (i.e. multiple rocket launchers, artillery systems and munitions, and tanks) or military personnel that could be used for an attack from the plant; 3.Off-site power to the plant should not be put at risk. To that effect, all efforts should be made to ensure that off-site power remains available and secure at all times; 4. All structures, systems and components essential to the safe and secure operation of the ZNPP should be protected from attacks or acts of sabotage; and 5. No action should be taken that undermines these principles. "Nuclear Safety, Security and Safeguards in Ukraine," IAEA, https://www.iaea.org/topics/response/nuclear-safety-security-and-safeguards-in-ukraine.

³⁸ IAEA, "Nuclear Safety, Security and Safeguards in Ukraine (GOV/2024/30)," May 27, 2024, p. 39.

confirmed.³⁹ The IAEA stated that these attacks were the first clear violations of the 'Five Principles' since they were proposed in May 2023.⁴⁰

On August 12, a fire occurred at the cooling tower. Nothing that the ZNPP is under Russian control, Ukrainian President Volodymyr Zelenskyy accused Russia of causing the fire. For its part, Russia claimed that the fire was caused by Ukrainian military shelling.⁴¹

On December 10, a drone attacked and damaged a vehicle heading towards ZNPP to replace IAEA staff. The IAEA Director General Rafael Grossi condemned, "in the most firm terms this attack on IAEA staff," and "[a]ttacking those who care for the nuclear safety and security of these plants is also absolutely unacceptable."⁴²

Other NPPs in Ukraine

Since mid-November 2024, military activity in Ukraine has caused damage to several substations connected to facilities in Khmelnytskyy, Rivne, Southern Ukraine and Chornobyl stations were damaged. In a statement on November 17, the IAEA Director General said, "[t]he country's energy infrastructure is extremely vulnerable, directly impacting nuclear safety and security."43 Securing access to the power grid is one of the 'Seven Pillars' that is essential not only for transmitting the electricity generated by NPPs, but also for the physical protection of facilities and other nuclear security functions of nuclear facilities. It was reported that two 330 kV power lines were no longer available at the Khmelnytskyy NPP.44

<u>Responses by the international</u> <u>community</u>

IAEA Secretariat

The IAEA Secretariat continued in Ukraine in 2024, following the Board of Governors resolutions⁴⁵ adopted after 2022 as well as the request from Ukraine.

³⁹ Ibid, p. 9.

⁴⁰ "Update 221 - IAEA Director General Statement on Situation in Ukraine," IAEA, April 9, 2024. https://www.iaea.org/newscenter/pressreleases/update-221-iaea-director-general-statement-onsituation-in-ukraine. In the same month, drone attacks were also reported to ISAMZ on the 9th and 18th IAEA, "Nuclear Safety, Security and Safeguards in Ukraine (GOV.2024/30)," May 27, 2024, p. 39.

⁴¹ "Ukraine and Russia Trade Blame over Fire at Zaporizhzhia Nuclear Plant" *BBC*, August 12, 2024, https://www.bbc.com/news/articles/c984l87l2w60.

⁴² "Update 264 - IAEA Director General Statement on Situation in Ukraine," IAEA, December 10, 2024, https://www.iaea.org/newscenter/pressreleases/update-264-iaea-director-general-statement-onsituation-in-ukraine.

⁴³ "Update 260 – IAEA Director General Statement on Situation in Ukraine," IAEA, November 17, 2024, https://www.iaea.org/newscenter/pressreleases/update-260-iaea-director-general-statement-onsituation-in-ukraine.

⁴⁴ Ibid.

⁴⁵ IAEA, GOV/2022/17, March 3, 2022; IAEA, GOV/2022/58, September 15, 2022; IAEA, GOV/2022/71, November 17, 2023; IAEA, GOV/2024/18, March 7, 2024. These resolutions "requested the Director General to continue to closely monitor the situation regarding nuclear safety, security and safeguards in Ukraine and regularly report formally to the Board on these matters."

The IAEA launched the ISAMZ and their experts have been stationed at the site since September 1, 2022. Such missions have also started at four other Ukrainian nuclear sites, namely the Rivne, South Ukraine, and Khmelnytskyy NPPs and the Chornobyl nuclear site since mid-January 2023. In addition to these five missions, the IAEA Support and Assistance Mission on the Safety and Security of Radioactive Sources in Ukraine (ISAMRAD) was sent to Kyiv in July 2023.⁴⁶

Each of these mission teams continued to monitor and access the status of nuclear safety and security at each facility and report to the IAEA Board of Governors in terms of the 'Seven Pillars' and the 'Five Principles.'

In the November, report by the IAEA Director General, it was stated that six of the 'Seven Pillars' of the ZNPP were either fully or partially at risk. Regarding the 'Five Principles,' while there were no signs of violation in 2024, the report stated that the IAEA's ability to assess the consistent compliance with the 'Five Principles' was limited due to the restriction of access to all relevant areas and discussions with ZNPP staff.⁴⁷

Regarding the new challenge of ensuring nuclear safety and security of nuclear facilities during armed conflict as described above, the IAEA has begun an internal review of challenges in the application of IAEA safety standards and nuclear security guidance documents in armed conflict situations.⁴⁸ In this relation, in the nuclear security resolution adopted at the IAEA General Conference in 2024, the following paragraph was inserted: "Encourages the Secretariat, in close consultation with Member States, to continue its work in reviewing nuclear security guidance to identify challenges in applying Nuclear Security Series in armed conflict situations, and to keep Member States informed" (para. 30).⁴⁹

IAEA Board of Governors and General Conference

At the IAEA Board of Governors meeting in March, the resolution on nuclear safety, nuclear security and safeguards in Ukraine was adopted. The resolution noted serious concern that the ZNPP was in a very precarious situation and that six of the 'Seven Pillars' had been compromised either fully or partially. In addition, the resolution also included support for the IAEA's efforts, the need for the IAEA to be able to confirm compliance by the relevant parties with the 'Five Principles' through ISAMZ, and the continuation of reporting on related matters to the IAEA Board of

⁴⁹ IAEA, GC(68)/RES/9, September 2024, p. 7.

⁴⁶ IAEA, "IAEA Director General Statement on Situation in Ukraine," July 24, 2023.

⁴⁷ IAEA, "Nuclear Safety, Security and Safeguards in Ukraine (GOV/2024/63)," November 13, 2024, p. 38.

⁴⁸ IAEA, GC(66)/RES/7, September 30, 2022, p. 11. "Encourages the Secretariat to consider developing, in close consultation with Member States, new nuclear security guidance to address the security risks and implications posed by armed attacks against nuclear facilities devoted to peaceful purposes, and further encourages the Agency to consider reflecting these aspects in further Nuclear Security Plans." (para. 66)

Governors.⁵⁰

At the 68th IAEA General Conference in September, the resolution entitled "Nuclear Safety, Nuclear Security and Safeguards in Ukraine" was adopted by a majority vote. In addition to the paragraphs included in the aforementioned Board of Governors' resolution in March, the following paragraphs were also included in this resolution:⁵¹

- "Calls upon the Russian Federation, ...to provide ISAMZ with unrestricted and timely access to and from all relevant locations at and around the ZNPP."
- "Encourages Member States to continue to...support to the IAEA comprehensive programme of technical support and assistance to Ukraine, including through the provision of necessary nuclear safety and security equipment as requested by Ukraine."

65 countries voted in favor of the resolution, 8 against, and 43 abstained. In a post-vote explanation, Russia noted that fewer countries were in favor of the resolution compared to the previous year. China opposed the draft resolution because it "clearly went beyond the Agency's mandate, introducing political considerations and undermining the Agency's independence as a professional international organization." Brazil, which abstained, explained that "the resolution contained elements that went beyond the statutory functions of the Agency and that such elements should have been addressed in the appropriate forums, notably the UN General Assembly and Security Council." South Africa, which also abstained, said that some parts of the draft resolution go beyond the IAEA's mandate.⁵²

In the general debate at the General Conference, the countries surveyed made the following remarks in addition to their remarks on the support for the IAEA's efforts and the 'Seven Pillars' and the 'Five Principles.'

- Belgium, Finland, Germany, Norway, and the United States mentioned that attacks on the ZNPP and on Ukraine's domestic energy infrastructure pose risks to nuclear safety and nuclear security.
- Russia stated that nuclear safety and nuclear security at ZNPP is an absolute priority and that it is ready to restart ZNPP if the military situation allows. It also condemned what it claimed were series of attacks on ZNPP by Ukraine.

⁵⁰ IAEA, GOV/2024/18, March 7, 2024.

⁵¹ IAEA, GC(68)/RES/15, September 2024. The resolution also recalled three resolutions adopted by the IAEA Board of Governors in 2022, and expressed serious concern that Russia had not responded to the Board's call for Russia to immediately cease all actions at and against Ukraine's nuclear facilities and to withdraw Russian military and other personnel from the ZNPP.

⁵² IAEA, GC(68)/OR.10, December 2024.

IAEA International Conference on Nuclear Security (ICONS)

Ensuring nuclear security during armed conflict was also a point of discussion at ICONS2024.

At ICONS2024, a Ministerial Declaration, which had been adopted by consensus at the previous ICONS (see (3)G of this chapter), was not adopted. Instead, the copresidents' Statement was issued as the outcome document. The co-presidents' Statement did not include a statement on the situation in Ukraine. However, it emphasized "any attacks or threats of attacks against nuclear facilities," and said that the 'Seven Pillars' should be noted.⁵³

The countries surveyed expressed the following opinions in their national statement:

- Belgium, Japan, Mexico, and Switzerland expressed support for the Seven Pillars and the 'Five Principles.'
- Australia, Canada, Germany, Norway, Switzerland, and the United Kingdom are mentioned their support for the ZNPP and nuclear facilities in Ukraine, including financial assistance and the dispatch of experts.

Preparatory Committee (PrepCom) for the NPT Review Conference (RevCon)

Meeting for the 11th Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) took place from July 22 to August 2. The Chair's Summary of the Meeting stated that many countries expressed serious concern about the state of nuclear security in Ukraine and supported the IAEA's efforts.⁵⁴

In addition, the importance of nuclear safety and security of nuclear facilities as well as nuclear materials for peaceful purposes in all situations, including armed conflict, was emphasized by the state parties, and the reference to the 'Seven Pillars' was included.⁵⁵

Response by the G7

At the G7 NPDG meeting held in April, the NPDG expressed grave concern about Russia's actions at the ZNPP and highlighted the need to ensure nuclear safety and nuclear security at nuclear facilities during the armed conflict. In addition, the NPDG reaffirmed its support for the IAEA's efforts to ensure nuclear safety and nuclear security in Ukraine. It also called for full respect for the 'Seven Pillars' and 'Five Principles' presented by the IAEA Director General. Furthermore, the NPDG demanded that Russia withdraw military and civilian personnel from the ZNPP and Ukraine, return full control of the ZNPP to

The Second Preparatory Committee

⁵⁵ NPT/CONF.2026/PC.II/WP.44, August 2, 2024.

⁵³ "Statement by the Co-Presidents of the International Conference on Nuclear Security 2024: Shaping the Future," May 24, 2024.

⁵⁴ NPT/CONF.2026/PC.II/7, August 2, 2024. p.11. As with the previous year's First Preparatory Committee Meeting, the Chair's Summary this time is said to reflect the Chair's opinions only and should not be considered as the basis for future work in the review process.

Ukraine, and refrain from any actions that could cause a nuclear incident at the plant.⁵⁶

In a report published in June 2024, the NSSG also expressed concern about the threat to nuclear safety and nuclear security at the ZNPP.⁵⁷ It also expressed support for the IAEA's activities, recognizing the importance of their continuity, and called for further coordination of communication between the relevant countries. The NSSG also expressed concern about the situation at the Chernobyl NPP and referred to the importance of activities within the framework of the International Chernobyl Cooperation Account, which supports nuclear safety and nuclear security at the facility.58

Ukraine's Peace Formula

In October 2024, the working group on nuclear safety and security, established under the "Ukraine's Peace Formula" proposed by Ukrainian President Zelensky in 2022, met in Paris. France, Japan, Sweden, the Czech Republic and Ukraine served as co-chairs of the working group, and discussed the risks, challenges and the need for international assistance to enhance nuclear safety and security of Ukrainian nuclear facilities.⁵⁹

The United Nations General Assembly

On July 11th, the United Nations General Assembly adopted a resolution on nuclear safety and security at Ukraine's nuclear facilities, including the ZNPP. Ukraine proposed the resolution, and Australia, Belgium, Canada, Finland, France, Germany, Japan, the Netherlands, Norway, Sweden, Switzerland and the United States joined as co-sponsors.⁶⁰

In terms of the voting behavior of the countries surveyed, in addition to the cosponsors, South Korea, Turkey and the United Kingdom voted in favor. On the other hand, Russia voted against the resolution, while Brazil, China, India, Iran, Kazakhstan, Mexico, Pakistan, South Africa and the UAE abstained.⁶¹ The

⁵⁶ "Statement of the G7 Non-proliferation Group," https://www.g7italy.it/wp-content/uploads/NPDG -Statement-2024.pdf.

⁵⁷ 2024 NSSG Report, pp. 1-2.

⁵⁸ The International Chernobyl Cooperation Account (ICCA) was established at the European Bank for Reconstruction and Development in November 2020 at the request of the Ukrainian government. Since the start of the Russian war against Ukraine the Account remit has been widened to support a range of measures to support the restoration of nuclear safety, security and decommissioning abilities within the Chornobyl Exclusion Zone. "The International Chernobyl Cooperation Account," European Bank for Reconstruction and Development, https://www.ebrd.com/what-we-do/sectors-and-topics/nuclearsafety/icca.html.

⁵⁹ The joint statement of the working group included the following: the importance of Ukraine's energy facilities installations for nuclear safety and nuclear security; the importance of the 'Seven Pillars' and the 'Five Principles'; the call for Russia to stop attacking Ukraine's energy infrastructure; and support for IAEA activities. "Communique on nuclear safety and security," October 18, 2024. https://www.regjeringen.no/en/aktuelt/communique-on-nuclear-safety-and-security/id3062207/.

⁶⁰ A/78/L.90, July 5, 2024.

⁶¹ "General Assembly demands immediate end to Russian aggression in Ukraine," United Nations, July 11, 2024, https://news.un.org/en/story/2024/07/1152016.

resolution included support for IAEA activities, which had been mentioned in resolutions by the IAEA General Conference and other bodies.⁶²

(2) Status of Accession to Nuclear Security and Safety-Related Conventions and Their Application to Domestic Systems

A) Accession status to nuclear security-related conventions

This section examines the accession status of the surveyed countries to international conventions related to nuclear security and safety, namely: the Convention on the Physical Protection of Nuclear Material (CPPNM); the Amendment to the CPPNM (A/CPPNM); the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT); the Convention on Nuclear Safety (CNS); the Convention on Early Notification of a Nuclear Accident; the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management; and the Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency. Some, if not all, of these nuclear safetyrelated conventions have provisions on

physical protection measures from the perspective of safety. As these measures can also serve for nuclear security purposes, those nuclear safety-related conventions are regarded as nuclear security-related conventions in this report.⁶³ Table 3-4 shows the adherence status of each surveyed country to the six conventions mentioned above.

The latest status of international conventions related to nuclear security are as follows:⁶⁴

- CPPNM⁶⁵ (entered into force in 1987): 165 signatories. Newly ratified by Liberia; the number of new signatories since 2016 has been two to three every year except in 2017 and has continuously increased, but there was no increase in 2022 and 2023. Liberia's ratification is the first increase in three years.
- A/CPPNM⁶⁶ (entered into force in 2016): 137 countries ratified. New ratifications by Liberia, and South Africa, which is the surveyed country. The number of new ratifying countries in recent years has been continuously increasing: 15 in 2016, 7 in 2017, 3 in 2018, 5 in 2019, 2 in 2020, 2 in 2021, 4 in 2022 and 3 in 2023.

⁶² A/RES/78/316, July 15, 2024.

⁶³ 2024 NSSG Report also mentioned these treaties.

⁶⁴ As of November 29, 2024.

⁶⁵ The Convention requires the criminalization of acts such as receipt, possession, use, transfer, alteration, disposal or dispersing nuclear material without lawful authority and which causes or is likely to cause personal or property damage, and theft of nuclear material. Efforts to universalize the Convention, including countries that do not have nuclear programs, continue to be important.

⁶⁶ While the CPPNM covers nuclear materials only during international transport, its Amendment expanded the scope to include domestic nuclear materials and nuclear facilities. Also, the Amendment covers criminal acts such as unauthorized transfer of nuclear materials and unlawful acts against nuclear facilities.

Joint Convention

					Convention on Early Notification of a Nuclear	Convention on Assistance in the Case of Nuclear Accident or Radiological	on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste
	CPPNM	A/CPPNM	ICSANT	CNS	Accident	Emergency	Management
China	0	0	0	0	0	0	0
France	0	0	0	0	0	0	0
Russia	0	0	0	0	0	0	0
U.K.	0	0	0	0	0	0	0
U.S.	0	0	0	0	0	0	0
India	0	0	0	0	0	0	
Israel	0	0	\bigtriangleup	\bigtriangleup	0	0	
Pakistan	0	0		0	0	0	
Australia	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0
Brazil	0	0	0	0	0	0	0
Canada	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0
Germany	0	0	0	0	0	0	0
Iran					0	0	\bigtriangleup
Japan	0	0	0	0	0	0	0
Kazakhstan	0	0	0	0	0	0	0
South Korea	0	0	0	0	0	0	0
Mexico	0	0	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0
Norway	0	0	0	0	0	0	0
South Africa	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	0	0
Switzerland	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0
UAE	0	0	0	0	0	0	0
North Korea					\bigtriangleup	\bigtriangleup	

Table 3-4: Signature and Ratification Status for Major Nuclear Security and Safety-related Conventions

 \bigcirc : Ratification, acceptance, approval, and accession \triangle : Signature

- ICSANT⁶⁷ (entered into force in 2007): 124 States Parties. Newly ratified by Mozambique and Palau. In recent years, the number of new States Parties has been 6 in 2017, 1 in 2018, 2 in 2019, 1 in 2020, 1 in 2021, 2 in 2022 and 2 in 2023.
- CNS⁶⁸ (entered into force in 1996): 96 States Parties. Newly ratified by El Salvador and Liberia. The number of new ratifying countries in 2023: 3 (the *Hiroshima Report 2024* states that two countries ratified in 2023, but ratification by Iraq (in November 2023)

⁶⁷ It obliges States Parties to criminalize the possession or use of radioactive materials or nuclear explosive devices with malicious intent, the use of nuclear facilities in a manner that leads to the emission of radioactive materials, or the destruction of such facilities.

⁶⁸ This Convention aims at ensuring and enhancing the safety of NPPs. State Parties are required to take legal and administrative measures, to report to the review committee established under this Convention, and to accept peer review in order to ensure the safety of NPPs under their jurisdiction.

was publicized after the *Report* was published).

- Convention on Early Notification of a Nuclear Accident⁶⁹ (entered into force 1986): 134 States Parties. Newly ratified by Liberia. No country ratified in 2023.
- Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency⁷⁰ (entered into force 1987): 129 States Parties. Newly ratified by Liberia. The number of new ratifying countries in 2023: 1.
- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management⁷¹ (entered into force in 2001): 90 parties as of February 2023. Newly ratified by Iraq. The number of new ratifying countries in 2023: 1.

In 2024, there was an increase in the number of ratifications for all conventions. South Africa, one of the countries surveyed, has ratified the A/CPPNM, and Liberia has ratified five related conventions.

The following statements from the countries surveyed and the IAEA General Conference resolution regarding the universalization and implementation of the conventions.

The 2024 NSSG Report of the G7 stated that the universalization and implementation of international instruments for nuclear safety and nuclear security remain a priority, and they are committed to continue outreach effort.⁷²

During the 68th IAEA General Conference held in September, among the surveyed countries, Japan, Kazakhstan, Norway, Switzerland and the United Kingdom expressed their support for the universalization of international legal documents related to nuclear security, including the A/CPPNM and the ICSANT and pledged to continue their efforts towards this end. Also, they called for the full implementation of these conventions.⁷³

The co-presidents' statement of ICONS2024 reaffirmed the importance of continuously promoting the universalization and implementation of the CPPNM and A/CPPNM, and also mentioned the importance of other related legal instruments such as ICSANT.⁷⁴ Israel called for participation

⁶⁹ This Convention obligates State Parties to immediately report to the IAEA when a nuclear accident has occurred, including the type, time, and location of the accident as well as relevant information.

⁷⁰ This Convention establishes an international framework that enables the provision of equipment and dispatch of experts with the goals of preventing and/or minimizing nuclear accidents and radiological emergencies.

⁷¹ The Joint Convention calls for its State Parties to take legal and administrative measures, report to its review committee, and undergo peer review by other parties, for the purpose of ensuring safety of spent fuel and radioactive waste.

⁷² 2024 NSSG Report, p. 3.

⁷³ "Statements to IAEA General Conference," IAEA; for the UK national statement, see "68th IAEA General Conference: UK national statement," Gov.UK, September 16, 2024, https://www.gov.uk/government/speeches/68th-iaea-general-conference-uk-national-statement.

⁷⁴ "Statement by the Co-Presidents of the International Conference on Nuclear Security 2024: Shaping

in the A/CPPNM, especially for countries in the Middle East region, in its national statement.⁷⁵

On the other hand, the preamble of the "Nuclear Security Resolution" adopted at the IAEA General Conference in 2024 included a paragraph that continued from previous year's resolution,⁷⁶ stated that "Respecting that participating in and joining international nuclear security instruments is a voluntary and sovereign decision of a state, while noting efforts towards the widest possible participation."⁷⁷

Transparency and information sharing while protecting sensitive information such as making part of IPPAS mission reports available to the public are also encouraged to ensure that countries implement nuclear security-related conventions and other international instruments (See (3)C) of this chapter). The status of the efforts in this area by the countries surveyed is shown in Table 3-5.

B) INFCIRC/225/Rev.5

Application status of each surveyed country of the measures recommended in INFCIRC/ 225/Rev.5

In 2011, the IAEA published the fifth revision of the "Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities" (INFCIRC/225/Rev.5) as IAEA Nuclear Security Series Document No. 13.

The introduction and implementation of physical protection measures in accordance with the recommended measures in INFCIRC/225/Rev.5, as well as the identification of issues and the formulation of individual measures, are entirely the responsibility of states and are left to the efforts of national regulatory authorities and operators. Therefore, it is important for states to disseminate information on the introduction and application of the measures recommended in INFCIRC/225/Rev.5. However, the amount of such information dissemination has gradually declined since the end of the 2016 Nuclear Security Summit process.

Regarding efforts related to apply recommended measures outlined in INFCIRC/225/Rev.5 by each country under this survey, actions have been taken

the Future 20-24 May 2024," https://www.iaea.org/sites/default/files/24/05/cn-321_co-presidents_statement.pdf

⁷⁵ "Statement by Israel," ICONS2024.

⁷⁶ Hiroshima Report 2024, p. 169.

⁷⁷ IAEA, (GC (68)/RES/9), September 2024.

	CPPNM Article 14.1	IPPAS Mission Report Made Available	UNSCR1540 Reporting
China	0		0
France	0		0
Russia	0		0
U.K.	0		0
U.S.	0		0
India			0
Israel	0		0
Pakistan			0
Australia	0	0	0
Belgium	0		0
Brazil			0
Canada	0	0	0
Finland	0	0	0
Germany	0		0
Iran			0
Japan	0	0	0
Kazakhstan	0		0
South Korea	0		0
Mexico	0		0
Netherlands	0	0	0
Norway	0		0
South Africa			0
Sweden	0	0	0
Switzerland	0	•	0
Turkey			0
UAE			0
North Korea			

Table 3-5: Status of Efforts to Share Information on Implementation of Nuclear Security Measures

" \bigcirc "indicates initiatives for which information was obtained from publicly available information, etc., or for which implementation was announced. " \bigcirc " indicates new initiatives in 2024 or newly identified initiatives.

announced. "•" indicates new initiatives in 2024 or newly identified initiatives. Sources: "Nuclear Security Summit 2016 Progress Reports," http://www.nts2016.org/2016-progress-reports; "NTI Index Country Action Tracker," Nuclear Threat Initiative, October 5, 2022, https://www.ntiindex.org/news/country-actions-october-2022-update/; "National Reports," UN 1540 Committee, https://www.un.org/en/sc/1540/national-implementation/national-reports.shtml; "IPPAS Mission Report: Australia," November 2013, https://www.dfat.gov.au/sites/default/files/international-physical-protection-advisory-service-ippas-missionreport.docx; "IPPAS Mission Report: Canada," October 2015, http://www.unclearsafety.gc.a/eng/ pdfs/IPPAS/Canadas-IPPAS-Mission-Report-2015-eng.pdf; "IPPAS Follow-up Mission Report: Japan," December 2018, https://www.nra.go.jp/data/000295616.pdf; "Draft Followup Mission Report: Sweden," October 2016, https://www.stralsaker hetsmyndigheten.se/contentassets/27a6dd9e94e54dc189cecfa7c7f2f910/draft-follow-up-mission-report-sweden.pdf; "Report of the International Physical Protection Advisory Service (IPPAS) mission to Finland," November 9, 2022, https://stuk.fi/documents/150192312/154550071/IPPAS_report_Final_29_Nov_2022.pdf; "IPPAS Follow-up Mission Report: Switzerland," May 2024. https://ensi.admin.ch/en/documents/ippas-follow-up-mission-report-switzerland/; "Nuclear Security Index 2020," Nuclear Threat Initiative, https://www.ntiindex.org/.

to date by all countries except North Korea for which there is no information. However, the extent and level of application vary among the respective countries.

The following describes the information disseminated at the IAEA General Conference and ICONS2024 and efforts made by the countries surveyed regarding the major recommended measures of the national physical protection systems for nuclear materials and nuclear facilities as indicated in INFCIRC/225/Rev.5 as well as efforts by international organizations.

Development of national laws and regulations

Each state is responsible for establishing and maintaining a national regulatory framework to govern physical protection.

- Belgium⁷⁸: "established a strict legislative and regulatory framework and have reinforced it, mainly with regard to response forces, screening,⁷⁹ cyber-security, security of radioactive materials and surface waste disposal facilities."
- Brazil⁸⁰: "the National Nuclear Security Authority, an independent regulatory body, has been established and is soon to become operational, in line with the best international practices."
- Canada: The amendments to the nuclear security-related regulations reported in the *Hiroshima Report 2024* are being implemented.⁸¹ The revised draft is scheduled to be published in the Canada Gazette between 2024 and 2025. The Canadian government has proposed revisions to several nuclearrelated regulations, including the ones related to the packaging and transportation of nuclear materials and radiation equipment.⁸²

- Finland⁸³: "currently revising its national nuclear legislation and regulations, to better facilitate technology independent licensing of SMRs."
- Mexico⁸⁴: "With support from the IAEA Integrated Nuclear Security Support Plan (INSSP) ⁸⁵ mission, the INSSP 2023-2025 was developed in 2023. The Plan outlines measures such as the regulatory framework, threat and risk assessment, and physical protection regime."
- \geq Pakistan: The revision of the national nuclear security regime document was announced at ICONS2024. According to the 2023 annual report published by the Pakistan Nuclear Regulatory Authority (PNRA), a nuclear securityrelated regulatory guide was issued in 2024 to promote understanding of regulatory requirements and support operators and other stakeholders. As for physical protection, there is a regulatory guide that provides guidance on the content of the physical protection program for nuclear facilities, which was published in December 2023.86 The purpose of this regulatory guide is to provide guidance to license applicants (facility operators)

⁷⁸ "Statement by Belgium," ICONS2024.

 $^{^{79}}$ It may refer to the trustworthiness of individual staff members as a countermeasure against insider threats.

⁸⁰ "Statement by Brazil," ICONS2024.

⁸¹ Hiroshima Report 2024, p. 171.

⁸² "CNSC Forward Regulatory Plan: 2024-2026," Canadian Nuclear Safety Commission, April 9, 2024, https://www.cnsc-ccsn.gc.ca/eng/acts-and-regulations/regulatoryplan/forward-regulatory-plan-details/.

^{83 &}quot;Statement by Finland," ICONS2024.

⁸⁴ "Statement by Mexico," ICONS2024.

⁸⁵ "The Integrated Nuclear Security Support Plan" became "the Integrated Nuclear Security Sustainability Plan" in 2023, with "Support" replaced by "Sustainability".

⁸⁶ 2023 Annual Report, Pakistan Nuclear Regulatory Authority, pp. 9-10.

on the format and content of physical protection programs for nuclear facilities.⁸⁷

- Turkey⁸⁸: "We are also working together with the IAEA for the preparation of the Integrated Nuclear Security Sustainability Plan for Turkey."
- UAE: 'FANR Regulation 08,' which was reported on in the *Hiroshima Report* 2024, was approved. In its national statement at ICONS2024, UAE announced that the regulation had been approved two weeks earlier.⁸⁹ The regulation includes requirements for the physical protection and cyber security of nuclear facilities, the transport of nuclear materials within the UAE.⁹⁰

Identification and assessment of threats (including insider threats)

It is recommended that physical protection in a country should be conducted based on each country's latest threat assessment (and/or Design Basis Threat (DBT)).⁹¹ When considering threats, particular attention should be given to insider threats,⁹² as individuals within the organization, with access rights, authority, and knowledge, pose a different risk compared to external threats. Insiders could bypass measures for nuclear security and safety procedures, given that they can utilize access rights and knowledge mentioned above.⁹³

The IAEA has continued outreach activities to raise the awareness of physical protection based on threat assessment and DBT. In December 2024, it held an "International Workshop on Threat Assessment and Design Basis Threat" in Pakistan for those in charge of formulating and implementing regulations in each country. In addition, the IAEA held five workshops on DBT in 2024.⁹⁴

As a development in this field among the countries surveyed, Brazil reported that it has completed a nuclear security threat assessment report in 2024.⁹⁵

⁸⁷ "Format and Content of Physical Protection Program of Nuclear Installations," Pakistan Nuclear Regulatory Authority, December 2023, https://www.pnra.org/upload/guidelines/PNRA-RG-909.02%20(Rev.1).pdf.

⁸⁸ "Statement by Turkey," ICONS2024.

^{89 &}quot;Statement of the United Arab Emirates," ICONS2024.

⁹⁰ "FANR's Board of Management Reviews Regulatory Oversight Activities at Barakah," *Aletihad*, May 24, 2024, https://en.aletihad.ae/news/uae/4488345/fanr-s-board-of-management-reviews-regulatory-oversight-acti.

⁹¹ DBT is generally not disclosed. Australia has produced a publicly available version of the DBT to show that its research reactor is protected against high-level threat. "Design Basis Threat," Australian Safeguards and Non-Proliferation Office, https://www.dfat.gov.au/international-relations/security/asno /Pages/design-basis-threat.

⁹² IAEA, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5), 2011, pp. 8-12.

⁹³ IAEA, Preventive and Protective Measures Against Insider Threats, 2020, pp. 3-4.

⁹⁴ Moldova, April 15-18; Uganda, May 14-17; Senegal, August 5-9; Sri Lanka, August 27-30; Moldova, October 1-4.

^{95 &}quot;Statement by Brazil," ICONS2024.

On August, a revised version of the "Joint Statement on the Reduction of Insider Threats" (INFCIRC/908/Rev.1) was submitted to the IAEA and circulated to the member states as part of the process of the Nuclear Security Summits. As with the original, the United States led the submission of the revised version, and the countries surveyed that also participated in the submission were Australia, Belgium, Canada, Finland, Germany, Israel and Norway. INFCIRC/908/Rev.1 also listed France, Japan, Kazakhstan, South Korea, Sweden, Switzerland, and the United Kingdom as countries that intend to formulate national-level measures to mitigate insider threats.

INFCIRC/908/Rev.1 included establishing an Advancing INFCIRC/908 International Working Group, developing practical tools for insider threat mitigation, sharing collective expertise and experiences, etc., as additional elements of highlight action and expertise of subscribers of this joint statement.⁹⁶

In addition, as an initiative to share good practices, Belgium and the United States held the Second International Symposium on Insider Threat Mitigation since 2019 in March 2024. This time, more than 200 people from 50 countries participated, and from the countries surveyed, Brazil, Canada, Germany, Finland, the Netherlands, South Africa, and the United Kingdom participated as presenters and moderators.⁹⁷ The INFCIRC/908/Rev.1 mentions that such symposiums will be held once every two years.

As for other countries surveyed, Russia hosted an IAEA training course on reducing insider threats for Bangladesh in its own country.⁹⁸

Cybersecurity

The following is information disseminated by the countries surveyed in 2024 regarding initiatives or statements in the area of cyber-security.

Brazil: On June 21, the Brazilian Energy Commission's Institute of Nuclear Energy Research (Instituto de Pesquisas Energéticas e Nucleares: IPEN) was designated as an IAEA Collaborative Center. One of the areas of cooperation with the IAEA includes computer security.⁹⁹ In addition, Brazil conducts cyber defense training related to the nuclear energy sector every year.¹⁰⁰

¹⁰⁰ "Statement by Brazil," ICONS2024.

⁹⁶ "INFCIRC/908/Rev.1," August 23, 2024.

⁹⁷ "2nd International Symposium on Insider Threat Mitigation," Insider Threat Mitigation, March 5-7, 2024, https://www.insiderthreatmitigation.org/symposium-2024; "Summary Report: Second International Symposium on Insider Threat Mitigation," https://www.insiderthreatmitigation.org/docs/NSD_2279.SummaryReport.FINALa.10.14.pdf.

⁹⁸ IAEA, Nuclear Security Report 2024, p. 17.

⁹⁹ "Grossi Praises Brazil's Contributions to Nuclear Development," *World Nuclear News*, June 25, 2024, https://www.world-nuclear-news.org/Articles/Grossi-praises-Brazil-s-contributions-to-nuclear-d.

- Japan¹⁰¹: At ICONS2024, Japan stated "in 2022, the Japanese government significantly enhanced its regulatory requirements of computer security for nuclear facilities and by 2023, the Government of Japan conducted onsite inspections on all operators using radioactive materials in order to confirm whether they conduct the security measures stipulated by law...plan to further improve our domestic regulations based on the findings obtained through these inspections."
- Russia¹⁰²: At ICONS2024, Russia stated "convinced that physical protection should remain the central element of nuclear security. The focus should not shift to other topics related to nuclear security, be it computer security issues or the use of new information and communication technologies, including artificial intelligence."
- UAE: FANR Regulation 08 includes cyber-security-related regulations, and it stipulates cyber-security requirements for nuclear facilities.¹⁰³

Nuclear security culture¹⁰⁴

It has been increasingly recognized in recent years that fostering and maintaining a nuclear security culture is extremely important to ensure the continued effectiveness of nuclear security measures, including for cybersecurity and insider threat. All organizations related to nuclear energy, including regulatory agencies and operators, are required to recognize the existence of the threat of nuclear terrorism and the importance of nuclear security, and to ensure that each individual is aware of their role and responsibilities in nuclear security.

The IAEA continues to conduct outreach activities to foster a nuclear security culture and held two workshops in 2024. One of these workshops, held in Malaysia in April, was on self-assessment of nuclear security culture.¹⁰⁵ Regarding IAEA activities on nuclear security, Russia stated that "the IAEA's priority should remain practical and technical assistance to the States in need in strengthening the physical protection of nuclear and other radioactive material and associated facilities, as well as the nuclear security culture. And this should be done

¹⁰¹ "Statement by Japan," ICONS2024.

¹⁰² "Statement by Russia," ICONS2024.

¹⁰³ "FANR's Board of Management Reviews Regulatory Oversight Activities at Barakah," *Aletihad*, May 24, 2024, https://en.aletihad.ae/news/uae/4488345/fanr-s-board-of-management-reviews-regulatory-oversight-acti.

¹⁰⁴ According to the definition by the IAEA, nuclear security culture is "the assembly of characteristics, attitudes and behaviours of individuals, organizations and institutions which serves as a means to support, enhance and sustain nuclear security." IAEA, *IAEA Nuclear Safety and Security Glossary 2022 (Interim) Edition*, October, 2022, p. 140.

¹⁰⁵ "National Workshop on Conducting Nuclear Security Culture Self-Assessments: Session II," IAEA, https://www.iaea.org/events/evt2401841.

exclusively upon relevant requests from States."106

The following are some of the major efforts by the countries surveyed regarding nuclear security culture and statements made at international conferences.

- \geq Japan: The deterioration of nuclear security culture became an issue in 2020 at the Tokyo Electric Power Company Holdings (TEPCO) Kashiwazaki-Kariwa Nuclear Power Station (KKNPS) due to incidents of ID card misuse and partial loss of physical protection functions.¹⁰⁷ On December 27, 2023, the Nuclear Regulation Authority lifted the order prohibiting the transfer of nuclear fuel materials that had been imposed on KKNPS. TEPCO requested the IAEA mission of nuclear security experts, and from March 25 to April 2, 2024, an IAEA expert team assessed the plant's physical protection measures. KKNPS received a follow-up IPPAS mission in 2018. The 2024 expert team identified that KKNPS has been making continuous improvements.108
- Pakistan: mentioned that nuclear security culture is a key element of its nuclear security policy.¹⁰⁹ In the PNRA's Annual Report 2023, conducting a nuclear security culture self-assessment was listed as one of the goals for 2024.¹¹⁰
- Switzerland¹¹¹: "supports the efforts of the Agency and its Member States to continuously strengthen nuclear security culture."

(3) Efforts to Maintain and Improve the Highest Level of Nuclear Security

A) Minimization of HEU and separated plutonium stockpile in civilian use

Today, minimizing HEU and separated plutonium inventory is one of the key indicators for achieving the highest level of nuclear security.¹¹² The co-presidents' statement of ICONS2024 called on the IAEA member states to voluntarily minimize their civilian HEU stockpiles further where technically and

¹⁰⁶ "Statement by Russia," ICONS2024.

¹⁰⁷ Hiroshima Report 2022, pp. 118-119.

¹⁰⁸ "IAEA Completes Nuclear Security Mission at Japan's Kashiwazaki-Kariwa Nuclear Power Station," IAEA, April 2, 2024, https://www.iaea.org/newscenter/pressreleases/iaea-completes-nuclear-security-mission-at-japans-kashiwazaki-kariwa-nuclear-power-station.

¹⁰⁹ "Statement by Pakistan," ICONS2024.

¹¹⁰ PNRA, Annual Report 2023, p. 67.

¹¹¹ "Statement by Switzerland," ICONS2024.

¹¹² Regarding separated plutonium, it was mentioned for the first time in the series of Nuclear Security Summits the need to maintain them at the minimum level in the communique of the 2014 Hague Summit. The Ministerial Declaration of ICONS 2020 called upon "all Member States possessing HEU and separated plutonium in any application, [...] to make sure they are appropriately secured and accounted for, by and in the relevant State," and encouraged "Member States, on a voluntary basis, to further minimize HEU in civilian stocks, when technically and economically feasible." "Ministerial Declaration," Ministry of Foreign Affairs of Japan, February 10, 2020, p. 1.
economically feasible.¹¹³ As a result of the 2004 GTRI as well as through a series of efforts through the Nuclear Security Summit process since 2010 to minimize the use of HEU and plutonium, South America, Central Europe, and Southeast Asia have become areas where there are no high-risk nuclear materials at present.¹¹⁴

<u>HEU</u>

The following statements were made by the countries surveyed at the IAEA General Conference, ICONS2024, and other events regarding efforts to minimize HEU.

- Belgium: In cooperation with the United States, the conversion of the medical isotope (Mo-99) production facility from HEU to low-enriched uranium (LEU) has been completed. In addition, test has been successfully conducted for the operation of the BR2 research reactor at the Belgian Nuclear Research Center using LEU. The plan is to convert the fuel for this research reactor to LEU by 2026.¹¹⁵
- Canada: In 2024, it was announced that between 2010 and 2023, more than 520 kg of HEU of U.S. origin had been

returned to the United States to dilute or dispose of it at nuclear research facilities in Canada.¹¹⁶

- Isreal: Mentioned support for global efforts to reduce HEU in research reactors.¹¹⁷
- \geq Japan: The Japanese Ministry of Education, Culture, Sports, Science and Technology and the U.S. Department of Energy announced that all excess HEU in Japan had been returned to the United States from the Kyoto University Critical Assembly (KUCA) and the Japan Atomic Energy Agency (JAEA) Materials Testing Reactor Critical Assembly, and that Kindai University had announced its commitment to converting the HEU fuel used in its research reactor to LEU.¹¹⁸ A joint statement was issued by both government of Japan and the United States on September 17 regarding convert from HEU to LEU of KUCA.119
- Kazakhstan: The project to convert the HEU fuel in the IVG.1M research reactor at the National Nuclear Energy Center to LEU fuel was completed in 2023, and the reactor is currently

¹¹³ "Statement by the Co-Presidents of the International Conference on Nuclear Security 2024: Shaping the Future," https://www.iaea.org/sites/default/files/24/05/cn-321_co-presidents_statement.pdf.

¹¹⁴ "Secretary Moniz Remarks on Nuclear Security at IAEA Conference," U.S. Department of Energy, December 5, 2016, https://www.energy.gov/articles/secretary-moniz-remarks-nuclear-security-iaea-conference.

¹¹⁵ "Statement by Belgium," ICONS2024.

¹¹⁶ NPT/CONF.2026/PC.II/4, June 6, 2024.

¹¹⁷ "Statement by Israel," ICONS2024.

¹¹⁸ "FACT SHEET: Japan Official Visit with State Dinner to the United States," Ministry of Foreign Affairs Japan, https://www.mofa.go.jp/mofaj/files/100652149.pdf.

¹¹⁹ "Japan-U.S. Issued Joint Statement on Conversion of the Kyoto University Critical Assembly (KUCA)," Ministry of Education, Culture, Sports Science and Technology, September 17, 2024, https://www.mext.go.jp/en/news/topics/detail/mext_00112.html.

operating on LEU fuel.¹²⁰ Technology development for HEU dilution and solidification in cooperation with the United States is underway. The necessary equipment for the system has been manufactured, and preparations for use are in progress.¹²¹

- Norway: The technology development project for HEU dilution is continuing with the NNSA and Savannah River National Laboratory in the United States. A ribbon cutting ceremony for the Mobile Melt-Consolidate system developed in this project was held in January 2024.¹²² The NNSA will support the operation of this system and its use in Norway in the future.¹²³ On May 22, NNSA and the Norwegian Ministry of Foreign Affairs issued a joint statement on cooperation in HEU minimization.¹²⁴
- South Africa¹²⁵: While recognizing the importance of minimizing the use of HEU for nuclear security, South Africa also argued that focusing on security

for both civilian and military use is necessary.

 \geq United States: In a report submitted to the Congress, the NNSA noted that, all major global producers of Mo-99 had completed the conversion of HEU to high-purity low-enriched uranium (HALEU) in 2023. It was also reported that 49 kg of HEU was transferred to the United States from partner countries in Asia, Europe, and North America for down blending and disposition.¹²⁶ The NNSA's report also mentioned the removal or disposal of more than 160 kg of weapons-grade nuclear material in cooperation with international partners, including Canada, France, Japan, Kazakhstan, and the Netherlands since 2020.127

In addition to the above-mentioned efforts by various each country to minimize HEU, Germany voluntarily reported on its civilian HEU stockpiles in its report on plutonium management

¹²⁰ "Statement by Kazakhstan," 68th IAEA General Conference, September 16, 2024.

¹²¹ "Nonproliferation Innovation at ORNL Makes International Impact at Kazakh Nuclear Site," Oak Ridge National Laboratory, December 3, 2024, https://www.ornl.gov/news/nonproliferation-innovation-ornl-makes-international-impact-kazakh-nuclear-site.

¹²² "The Nuclear Paradigm Shift: SRNL Modular Systems Transform Global Security," Savannah River National Laboratory, September 17, 2024, https://www.srnl.gov/matter_magazine/the-nuclear-paradigm-shift-srnl-modular-systems-transform-global-security/.

¹²³ "NNSA Administrator Jill Hruby Remarks at National Institute for Deterrence Studies Peace Through Strength Breakfast," NNSA, July 30, 2024, https://www.energy.gov/nnsa/articles/nnsa-administrator-jill-hruby-remarks-national-institute-deterrence-studies-peace-2.

¹²⁴ "Joint Statement between the National Nuclear Security Administration of the Department of Energy of the United States of America and The Ministry of Foreign Affairs of Norway concerning Minimization of Highly Enriched Uranium," May 22, 2024, https://www.energy.gov/sites/default/files/2024-05/2024%20US-Norway%20agreement.pdf.

¹²⁵ "Statement by South Africa," ICONS2024.

¹²⁶ Prevent, Counter, and Respond—NNSA's Plan to Reduce Global Nuclear Threats FY 2025-FY 2029, NNSA, p. 2-2.

¹²⁷ "Statement by the United States," ICONS2024.

(INFCIRC/549) in 2024.¹²⁸ Germany was the only country that reported on HEU holdings by the end of 2024.¹²⁹ Such reporting is encouraged in the Joint Statement on Minimizing and Reducing Highly Enriched Uranium for Civilian Use (INFCIRC/912), issued in 2017, using the standardized form for voluntary reporting attached to this Joint Statement.¹³⁰ The use of the standardized form allows for the sharing of information that is desired to be disclosed and, if submitted on a regular basis, allows the international community to evaluate the country's efforts to minimize HEU.

Twenty-one countries are participating in the Joint Statement, including six countries surveyed for *Hiroshima Report* possessing HEU. Only two out of these six countries (Australia and Norway) have so far submitted reports to the IAEA using this form. No country did so in 2024.¹³¹

Separated plutonium

While the Nuclear Security Resolution adopted at the 68th IAEA General Conference recognizes the importance of minimizing HEU use where technically and economically feasible, it does not mention minimizing separated plutonium.¹³² The communiqué of the 2014 Hague Nuclear Security Summit, however, encourages states to keep their stockpile "to the minimum level, as consistent with national requirements."¹³³

In this regard, in February, the Japan Federation of Electric Power Companies announced Plutonium Utilization Plan for FY2024. In response to this Plan, on February 28, the Japan Atomic Energy Commission (JAEC) stated that the amount of plutonium held in FY2024 is expected to be about 44.5 tons, since no new plutonium will be recovered and no plutonium will be consumed. With this, the JAEC stated their views that Plan is appropriate at this moment, taking also into account the operation plan of the plutonium thermal reactors in FY2023, the outlook for the operation of the Rokkasho Reprocessing Plant and other facilities, as well as the status of efforts to produce Mixed Oxide (MOX) fuel from the plutonium held overseas.¹³⁴

¹²⁸ INFCIRC/549/Add.2-27, September 6, 2024.

¹²⁹ The United Kingdom also reported its inventory of HEU every year, but the report was not published during the survey period in 2024.

¹³⁰ "Joint Statement on Minimising and Eliminating the Use of Highly Enriched Uranium in Civilian Applications," INFCIRC/912, February 16, 2020; "Australia's 2019 INFCIRC/912 HEU Report," *IPFM Blog*, January 23, 2020, http:// fissilematerials.org/blog/2020/01/australias_2019_infcirc91.html.

¹³¹ INFCIRC/912/Add.4, March 5, 2020 (Australia); INFCIRC/912/Add.3, August 19, 2019 (Norway). France, Germany, and the United Kingdom voluntarily added HEU inventory to their reporting of civilian separated plutonium inventory quantities under the International Plutonium Management Guidelines (INFCIRC/549).

¹³² GC(68)/RES/9, September 2024, p. 3.

¹³³ "The Hague Nuclear Security Summit Communiqué," Ministry of Foreign Affairs of Japan, March 25, 2014, https://www.consilium.europa.eu/media/23823/141885.pdf.

¹³⁴ Japan Atomic Energy Commission, "Plutonium Utilization Plans Published by the Federation of Electric Utilities and others (Opinion)," February 27, 2024, https://www.aec.go.jp/jicst/NC

B) Prevention of illicit trafficking

Nuclear detection, nuclear forensics, research and development of new technologies to strengthen capacity of law enforcement and customs, as well as participation in the IAEA's Incident and Trafficking Database (ITDB) have all been regarded as important for preventing illicit trafficking of nuclear materials. The ITDB is a database on incidents related to unauthorized possession, illicit trafficking, illegal dispersal of radioactive material, as well as discovery of nuclear and other radioactive material out of regulatory control. It has been attracting attention as it provides useful statistics which enable one to realize the real threat of nuclear terrorism. In the co-presidents' statement of ICONS2024, IAEA member states were encouraged to voluntarily share relevant information with the database to prevent the illicit trafficking of nuclear and other radioactive materials and their use for malicious purposes.¹³⁵

According to *Incident and Trafficking Database (ITDB) 2024 Factsheet*, Somalia and Togo newly joined the ITDB, bringing the total number of participating countries to 145 as of the end of 2023 (see Table 3-6 for participation status of countries surveyed).¹³⁶ From the start of the ITDB in 1993 to the end of December 2023, 4,243 cases were reported in total. In 2023, 168 incidents were reported in total by 31 countries, which is an increase of 22 incidents from 2022.137 The IAEA points out on these trends that "these indicate that unauthorized activities and events involving nuclear and other radioactive material, including incidents of trafficking and malicious use, continue to follow historical averages."138 The number of reports to the ITDB in recent years had decreased between 2020 and 2021, the number of incidents reported by Stats followed historical averages in 2023.¹³⁹

The ITDB categorizes the types of incidents in three groups. Group I: incidents that are, or are likely to be, connected with trafficking or malicious use; Group II: incidents of undetermined intent, and Group III: incidents that are not, or are unlikely to be, connected with trafficking or malicious use.

Of the 4,243 confirmed incidents, there were 350 within Group I, 1,045 incidents within Group II and 2,848 incidents within Group III. Of these, 14% of all

[/]about/kettei/20240227_e.pdf.

¹³⁵ "Statement by the Co-Presidents of the International Conference on Nuclear Security 2024: Shaping the Future," https://www.iaea.org/sites/default/files/24/05/cn-321_co-presidents_statement.pdf.

¹³⁶ IAEA Incident and Trafficking Database (ITDB) 2024 Factsheet, IAEA, https://www.iaea.org/sites/defaul t/files/24/05/itdb_factsheet_2024.pdf.

¹³⁷ Ibid, p. 1.

¹³⁸ Ibid, p. 2.

¹³⁹ The IAEA states that the background to this was the impact of COVID-19.

	HEU and Plutonium Stockpile Minimization in Civilian Application	Participation in the ITDB
China	0	0
France	0	0
Russia	0	0
U.K.	0	0
U.S.	•	0
India	0	0
Israel	0	0
Pakistan		0
Australia	0	0
Belgium	•	0
Brazil	\bigcirc Completely removed	0
Canada	0	0
Finland	Never possessed	0
Germany	0	0
Iran		0
Japan	•	0
Kazakhstan	•	0
South Korea	\bigcirc Completely removed	0
Mexico	\bigcirc Completely removed	0
Netherlands	0	0
Norway	•	0
South Africa	0	0
Sweden	\bigcirc Completely removed	0
Switzerland	\bigcirc Completely removed	0
Turkey	\bigcirc Completely removed	0
UAE	Never possessed	0
North Korea		

Table 3-6: Implementation Status of Minimization of HEU and Plutonium Stockpiles in Civilian Application and Measures for Preventing Illicit Trafficking

"•" indicates that the commitment to HEU minimization in 2024 has been confirmed.

"O" indicates past efforts.

cases involved nuclear material,¹⁴⁰ 59% involved other radioactive material and 27% involved radioactive contamination or other material.¹⁴¹ It is estimated that about 52% of all theft incidents since 1993 have occurred during authorized transport. Over the past decade, the proportion of incidents during transportation has been about 65%, which is higher than the 62% reported last year for the past decade. Therefore, the IAEA continuously highlighted the importance of strengthening measures to protect radioactive materials during transport. The majority of materials reported to the ITDB as stolen or lost (or otherwise missing under uncertain circumstances), involve radioactive sources that are used

 $^{^{\}rm 140}$ These included 12 cases of HEU, three cases of plutonium and five cases of plutonium-beryllium neutron sources.

¹⁴¹ ITDB 2024 Factsheet, p. 3.

in industrial, material analysis or medical applications.¹⁴²

With regard to the reporting to the ITDB, it is important to report incidents through the designated point of contact of each participating country. The IAEA held an international training course for contact point personnel from each country in November 2023. In December of the same year, the IAEA published the "Guidelines for the ITDB States' Points of Contact."143 The IAEA stated that it would support the implementation of recommended nuclear security measures at the national level by participating countries through these guidelines, by enhancing awareness of the benefits of comprehensive reporting and analysis by the ITDB.144

Note that the ITDB does not disclose details of reported cases or illicit trafficking in order to protect sensitive information in participating countries.

In 2024, the following cases of theft and discovery of nuclear and radioactive materials out of regulatory control were reported.

 On February 21, the United States Attorney announced that two people affiliated with a Japanese organized crime syndicate had been indicted for smuggling nuclear materials out of Myanmar. When undercover agents from the U.S. Drug Enforcement Administration approached the two men in Thailand, they presented samples of nuclear materials. The United States seized the samples with the cooperation of Thai authorities. Later, nuclear forensic laboratory in the United States analyzed the samples and confirmed that they contained uranium and weapon-grade plutonium.¹⁴⁵

- In Sao Paulo, Brazil, on June 30th, a vehicle carrying containers containing germanium-68 and technetium-99 was stolen while parked. Some of the radioactive material was recovered. It is believed that the vehicle was parked outside an employee's home without following proper procedures.¹⁴⁶
- In November, in Toyama Prefecture, Japan, an intact metal container containing radioactive material that had been purchased by the university about 50 years ago was discovered in the home of a deceased former university professor (the container was labeled "carbon-14"). The university reported the matter to the Nuclear Regulation

¹⁴² IAEA points out that "Devices containing radioactive sources can be attractive to a potential thief as they may be perceived to have a high resale or scrap metal value."

¹⁴³ IAEA, "Guidelines for the ITDB States' Points of Contact (IAEA Services Series No.49)," December 2023.

¹⁴⁴ IAEA, Nuclear Security Report 2024, p. 16.

¹⁴⁵ "U.S. Attorney Announces Nuclear Materials Trafficking Charges Against Japanese Yakuza Leader," United States Attorney's Office, February 21, 2024, https://www.justice.gov/usao-sdny/pr/us-attorney-announces-nuclear-materials-trafficking-charges-against-japanese-yakuza.

¹⁴⁶ "Part of Stolen Radioactive Material Found in Sao Paulo," *The Brazilian Report*, July 8, 2024, https://brazilian.report/liveblog/politics-insider/2024/07/08/stolen-radioactive-material-found-in-sao-paulo/.

Authority and stored the container in the radiation-controlled area in the university.¹⁴⁷

In connection with the illicit trafficking of nuclear and other radioactive materials, countries are working to develop national nuclear security detection architectures, and the IAEA has been assisting them through the development of roadmaps for their design and implementation. Five new countries drafted roadmaps for 2023, bringing the total number of countries using roadmaps to 41.¹⁴⁸

Ensuring nuclear security at major public events (MPEs) in each country has also become important. IAEA member states have been requesting the IAEA to support the provision of hand-held radiation detection equipment, assistance with preparing MPEs, and support for the operation, maintenance, and configuration of detection equipment. In 2023, four countries received equipment on loan from the IAEA, and two countries received equipment as a donation.¹⁴⁹

Human resource development was carried out to ensure nuclear security at MPEs. According to the IAEA's 2024 Nuclear Security Report and Nuclear Security Review, China and the UAE held training and workshop.¹⁵⁰

The IAEA issued two relevant technical guidance documents in 2024. One is related to the security of nuclear and radioactive materials in transport and aims to provide guidance to national regulatory authorities on protecting nuclear and radioactive materials in transfer from theft and sabotage.¹⁵¹ The other is related to the detection of nuclear and radioactive materials out of regulatory control in a country. This guidance is also for national regulatory authorities and related government agencies. It covers the planning, implementation and evaluation of national systems for detecting nuclear and radioactive materials out of regulatory control.¹⁵²

In terms of the efforts by the countries surveyed, India mentioned in its national statement for ICONS2024 that it had reorganized the inter-ministerial task force for the prevention, detection and investigation of nuclear smuggling.¹⁵³ China and Japan each hosted an IAEA workshop on nuclear security of materials

¹⁴⁷ "Radioactive Materials Found at Home of Former Toyama University Faculty Member, No Effect on Human Body," NHK, November 16, 2024. https://www3.nhk.or.jp/lnews/toyama/20241116/3060 018451.html. (in Japanese)

¹⁴⁸ IAEA, Nuclear Security Review 2024, p. 29.

¹⁴⁹ Ibid. pp. 29-30.

¹⁵⁰ IAEA Nuclear Security Report 2024 p. 20; IAEA Nuclear Security Review 2024, p. 17.

¹⁵¹ Security of Nuclear and Other Radioactive Material in Transport (LAEA Nuclear Security Series No. 46-T), IAEA, November 2024.

¹⁵² Detection in a State's Interior of Nuclear and Other Radioactive Material out of Regulatory Control (IAEA Nuclear Security Series No. 47-T, IAEA, June, 2024.

¹⁵³ "Statement by India," ICONS2024.

out of regulatory control in their own country.¹⁵⁴

C) Acceptance of international nuclear security review missions

The IAEA's international assessment missions, in which international experts provide advice on the implementation of international instruments and IAEA guidance on the protection of nuclear and other radioactive material and related facilities and activities, include the IPPAS,¹⁵⁵ the International Nuclear Security Advisory Service (INSServ) missions as well as the mission to develop Integrated Nuclear Security Sustainability Plans (INSSP).¹⁵⁶ In addition, a new advisory mission, the Regulatory Infrastructure Mission for Radiation Safety and Nuclear Security (RISS), was launched in March 2022.157

IPPAS missions, which are particularly high-profile, were received in 2024 by Romania, Rwanda, the Republic of Congo, and Zimbabwe in addition to Japan and the United States, which are the countries surveyed in this report. For Rwanda, the Republic of Congo, and Zimbabwe, it was first time for them to receive this mission.¹⁵⁸

Belgium co-hosted an IPPAS seminar with the IAEA in October. Belgium announced that it has requested an IPPAS mission for 2027.¹⁵⁹ In addition, France is plan to receive an IPPAS mission in 2027.¹⁶⁰

While there has been a noticeable trend toward active acceptance of IPPAS missions and follow-up missions in the Western countries covered by this survey, there are a certain number of countries that have never accepted a mission, indicating a bifurcation of the situation (see Table 3-7).

It once became a trend to make an IPPAS mission report available to the public while protecting sensitive information, from the perspective of transparency and accountability regarding the status of nuclear security implementation in countries. To date, Australia, Canada, Finland, Japan, the Netherlands, and

¹⁵⁴ IAEA, Nuclear Security Review 2024, p. 16.

¹⁵⁵ An international team of experts from Member States and IAEA reviews the nuclear security situation as implemented by mission host states, against the international guidelines and good practices contained in the 2005 A/CPPNM and IAEA Nuclear Security Series documents. The review will cover all aspects, from the regulatory framework to transport, information and computer security arrangements.

¹⁵⁶ Previously known as the Integrated Nuclear Security Support Plan. "Support" was replaced by "Sustainability" in 2023.

¹⁵⁷ IAEA, Nuclear Security Review 2023, p. 9.

¹⁵⁸ "IAEA Completes International Physical Protection Advisory Service Mission in Rwanda," November 8, 2024, https://www.iaea.org/newscenter/pressreleases/iaea-completes-international-physicalprotection-advisory-service-mission-in-rwanda; "IAEA Completes International Physical Protection Advisory Service Mission in the Republic of Congo," IAEA, October 25, 2024, https://www.iaea.org/newscenter/pressreleases/iaea-completes-international-physical-protectionadvisory-service-mission-in-the-republic-of-the-congo.

¹⁵⁹ "Statement by Belgium," ICONS2024.

¹⁶⁰ "Statement by France," ICONS2024.

	IPPAS	Nuclear Forensics	Nuclear Security Fund	G7GP	GICNT
China		0	•		0
France	0	•	•	0	0
Russia		0	•		0
U.K.		•	•	0	0
U.S.	•	•	•	0	0
India		0			0
Israel		0			0
Pakistan		0	•		0
Australia		0		0	\bigcirc
Belgium	0	0	•	0	0
Brazil		0			
Canada		•	0	0	0
Finland	0	•	•	0	0
Germany	0	•	•	0	0
Iran					
Japan	•	•	•	0	0
Kazakhstan		•		0	0
South Korea		•	•	0	0
Mexico		•		0	0
Netherlands	0	•	•	0	0
Norway		•	0	0	\bigcirc
South Africa		•			
Sweden		•	0	0	0
Switzerland	0	•	•	0	0
Turkey	0	0			0
UAE		0			0
North Korea					

Table 3-7: Participation Status in and Efforts toward Nuclear Security Initiatives

IPPAS: "●" indicates acceptance in 2024. "○" indicate acceptance in the past five years.

Nuclear Forensics: "O" indicates past participation in ITWG activities or other achievements (obtained from public information).

Nuclear Security Fund: "O" indicates new contributions confirmed for 2024. "O" indicate the actual contributions made in the past three years.

Sweden released part of their reports. In addition to these countries, Switzerland released in May 2024 part of the reports of the 2018 IPPAS and the 2023 followup mission.¹⁶¹ for radioactive materials out of regulatory control. In 2024, Costa Rica and Thailand hosted this mission.¹⁶² A total of 87 missions have been carried out to date.

INSServ is a mission initiated in 2006 to review national nuclear security regimes

¹⁶¹ "IPPAS Follow-up Mission Report: Switzerland," Swiss Federal Nuclear Safety Inspectorate, May 21, 2024, https://ensi.admin.ch/en/documents/ippas-follow-up-mission-report-switzerland/.

¹⁶² "IAEA Mission to Costa Rica Encourages Continued Improvement in Nuclear Security Arrangements," IAEA, March 18, 2024, https://www.iaea.org/newscenter/pressreleases/iaea-mission-to-costa-ricaencourages-continued-improvement-in-nuclear-security-arrangements; "IAEA Mission to Thailand Finds a Robust Framework for Nuclear Security Arrangements, Encourages Improvements," IAEA, September 13, 2024, https://www.iaea.org/newscenter/pressreleases/iaea-mission-to-thailand-finds-a-robustframework-for-nuclear-security-arrangements.

D) Technology development - nuclear forensics

Nuclear forensics is an important technology for nuclear security in that it can identify and prosecute perpetrators of illicit trafficking and malicious acts involving nuclear and radiological materials. Efforts and support for further advancement of this technology, the establishment of national systems as well as international networking systems have been made to date. Capacity building in the areas of radiological crime scene management and nuclear forensics continues to be important for countries. The Nuclear Security Resolution adopted by the IAEA General Conference in September continuously encouraged countries that have not yet done so "to consider establishing, where practical, national nuclear forensics libraries"¹⁶³ (para. 56).¹⁶⁴

The IAEA held an International Integrated Workshop on Radiological Crime Scene Management and Nuclear Forensics in May at the Nuclear Security Training and Demonstration Center (NSTDC).¹⁶⁵ An important multilateral cooperation effort on nuclear forensics technology is the International Technical Working Group on Nuclear Forensics (ITWG), which was established in 1995. To date, more than 50 countries have participated in its annual meetings.¹⁶⁶

In June, the ITWG held its 27th annual meeting in Manchester, the United Kingdom, with approximately 80 participants from more than 30 countries and international organizations. The IAEA and the International Criminal Police Organization (INTERPOL) made presentations on their current activities and upcoming training, workshops and conferences. The IAEA also mentioned that it plans to hold a technical meeting on nuclear forensics in 2025. The United Nations Office on Drugs and Crime (UNODC) also participated in the meeting for the first time and gave a presentation on its CBRN terrorism prevention program.¹⁶⁷

Recent achievements of the ITWG were discussed, including the website development work by the Outreach and Training Task Group funded by France. In

¹⁶³ "A National Nuclear Forensics Library is a national system for the identification of nuclear and other radioactive materials found out of regulatory control. A Library enables comparisons to information on known materials and data obtained from analytical measurements of nuclear or other radioactive materials found out of regulatory control." IAEA, "Development of a National Nuclear Forensics Library: A System for the Identification of Nuclear or Other Radioactive Material out of Regulatory Control," IAEA-TDL-009, 2018, p. 1.

¹⁶⁴ IAEA, "Nuclear Security Resolution," September 2024, p. 10. Whether to build a national nuclear forensics library is a matter of national sovereignty, and according to the ISCN, the number of countries that are building such libraries is quite small by global standards. "How Far Has the Nuclear Forensics Library Establishment Progressed? (in Japanese)," ISCN, December 2021, https://www.jaea.go.jp/04/iscn/activity/2021-12-15/2021-12-15-07.pdf.

¹⁶⁵ IAEA Nuclear Security Report 2024, p. 19.

¹⁶⁶ Nuclear Forensics Update, No. 24, ITWG, September 2022, p. 2.

¹⁶⁷ Nuclear Forensics Update, No. 32, ITWG, September 2024, pp. 3-5.

addition, a comprehensive *After Action Report* on the 7th Collaborative Material Comparison Exercise (CMX) was presented.

The five ITWG task groups are also continuing their active work.¹⁶⁸ For example, the Evidence and Testimony Task Group (ETTG) is developing a discussion tool for a tabletop exercise on the management of a radiological crime scene. This discussion tool can be used for various purposes such as prioritization of evidence collection and review of national regulations.

In addition, discussions on the 8th CMX were held in the Exercise Task Group, and in addition to the conventional exercises, exercises that included queries to a national nuclear forensics library were considered. The 8th CMX is scheduled to begin in October 2024 at the time of the annual meeting.¹⁶⁹

In 2024, the IAEA held 10 training courses and workshops related to nuclear forensics and four training courses and workshops related to crime scene management. These included practical introductory level training courses and train-the-trainer courses. Among the countries surveyed, France and Germany each hosted one IAEA training course in this area.

The IAEA has plans to train basic and advanced level trainers and hold workshops in the fields of crime scene management and nuclear forensics, and to produce technical documents for the development and maintenance of nuclear forensics capabilities.¹⁷⁰

As for activities in the countries surveyed other than those mentioned above, Canada stated at ICONS2024 that it was continuing to establish its federal nuclear forensics framework.¹⁷¹ In addition, Kazakhstan held a side event at the ICONS2024 on the development and maintenance of nuclear forensics capabilities.¹⁷² In the *Nuclear Security Review* 2024, the IAEA reported that the United States had hosted an IAEA training course in February 2023.¹⁷³

E) Human resource development and capacity building and support activities

It is an essential responsibility of each state to build the capacity of organizations and people to establish, implement and sustain a nuclear security regime.¹⁷⁴ The

¹⁶⁸ The ITWG has established the following task groups to examine technical priorities in detail: Evidence and Testimony; Exercises; Guidelines; Libraries and Assessment; and Outreach and Training. "Organization," ITWG, https://www.nf-itwg.org/content.html.

¹⁶⁹ ITWG Nuclear Forensics Update, No.32, September 2024, pp. 4-6.

¹⁷⁰ IAEA, Nuclear Security Review 2024, p. 32.

¹⁷¹ "Statement by Canada," ICONS2024.

¹⁷² "Side Events Organized at the International Conference on Nuclear Security: Shaping the Future 20-24 May 2024," https://www.iaea.org/sites/default/files/24/05/icons_2024_side_event_schedule.pdf.

¹⁷³ IAEA, Nuclear Security Review, p. 18.

¹⁷⁴ IAEA, "Building Capacity for Nuclear Security Implementing Guide," IAEA Nuclear Security Series,

IAEA plays an important role in providing coordinated education and training programs that strengthen capabilities in states to address and sustain nuclear security.¹⁷⁵

The IAEA also began human resources development through utilizing the IAEA NSTDC, which was established in 2023. The IAEA's *Nuclear Security Report 2024* reported that 38 events were held at NSTDC.¹⁷⁶ Regarding the NSTDC, the co-presidents' statement of ICONS2024 welcomed the opening of the NSTDC and emphasized that it would complement existing activities such as the National Nuclear Security Training and Support Centers (NSSC) in each country and support the IAEA's efforts to strengthen national nuclear security regimes.¹⁷⁷

Russia stated at ICONS2024, "we emphasize the exceptional importance of implementing education and training programmes in the field of nuclear security. We give priority in this regard to the matters of professionalism, as well as considerations of equitable geographical distribution. In this regard, we note the work of the IAEA Nuclear Security Training and Demonstration Centre, which became operational in 2023, and its complementary role in relation to national and international institutions for capacitybuilding in this area."¹⁷⁸

The IAEA also organized training in the countries surveyed. According to the IAEA's *Nuclear Security Report 2024* and *Nuclear Security Review 2024*, in addition to the items already mentioned in this chapter, training and workshops were held in Australia, the Netherlands, Pakistan and Russia on topics such as physical protection, the development of domestic systems, and train the trainer, etc.¹⁷⁹

Human resource development of the next generation in nuclear security field is also a challenge. The G7 NSSG emphasized that "[t]aking note of the current forecasts projecting a significant increase worldwide of the use of nuclear power, the NSSG emphasizes that such ambitious goals need to be accompanied by equivalent efforts in capacity building programs, targeted not only on industrial needs, but also on the education and training of the next generation of experts in nuclear

No. 31-3, 2018, p. 1.

¹⁷⁵ IAEA, Nuclear Security Plan 2022-2025, GC(65)/24, September 15, 2021, p. 18.

¹⁷⁶ IAEA, Nuclear Security Report 2024, p. 12.

¹⁷⁷ "Statement by the Co-Presidents of the International Conference on Nuclear Security 2024: Shaping the Future," https://www.iaea.org/sites/default/files/24/05/cn-321_co-presidents_stateme nt.pdf. The construction and operation are supported by financial assistance and donations of goods from donor countries. As of September 2024, support has been received from Armenia, Belgium, Brazil, Canada, China, Denmark, France, Germany, Italy, South Korea, Russia, Saudi Arabia, Sweden, Switzerland, the United Kingdom, the United States, and the EU. "Donors," IAEA NSTDC, https://www.iaea.org/about/organizational-structure/department-of-nuclear-safety-and-security/div ision-of-nuclear-security/iaea-nuclear-security-training-and-demonstration-centre/donors.

¹⁷⁸ "Statement by Russia," ICONS2024.

¹⁷⁹ IAEA, Nuclear Security Report 2024, pp. 10-13; IAEA Nuclear Security Review 2024, p. 10.

safety and security."180

One example of next-generation human resource development is the Nuclear Science and Security Consortium, hosted by the University of California, Berkeley, and supported by the United States NNSA. The Nuclear Security and Nonproliferation Summer School, held in July 2024, provided practical modules including emergency response and nuclear forensics.¹⁸¹ In addition, the Integrated Support Center for Nuclear Nonproliferation and Nuclear Security (ISCN) at JAEA runs a program entitled the "ISCN Summer School" that accepts summer interns and helps them deepen their understanding of nuclear nonproliferation and nuclear security.¹⁸²

There are also efforts have been made by a non-governmental organization, the World Institute for Nuclear Security (WINS). In addition to holding workshops and publishing reports on various issues related to nuclear security, WINS provides human resource development through the WINS Academy, which offers professional development programs in various fields related to nuclear security.¹⁸³

International network for training and support

The IAEA's activities on training for human resource development and capacity building are carried out in close cooperation with states, including the activities of National Nuclear Security Support Centres (NSSCs) and the International Network of NSSCs (NSSC Network).

The International Network of NSSCs, established by the IAEA in 2012, plays an important role as a keystone for collaboration and networking among national NSSCs.¹⁸⁴ Eighty-four institutions from 71 countries and 10 observers are participating in the NSSC network.¹⁸⁵ Countries participating in the NSSC network in the countries surveyed for the Hiroshima Report include Brazil, Canada, China, France, Japan, Kazakhstan, South Korea, Pakistan, Russia and the United States.¹⁸⁶ To date, the following six regional and sub-regional groups have been established: the Africa regional group; the Arab States in Asia group; the

¹⁸⁰ 2024 NSSG Report, p. 3.

¹⁸¹ "2024 NSSC-LLNL Nuclear Security and Nonproliferation Summer School," Nuclear Science and Security Consortium, https://nssc.berkeley.edu/events/nssc-summer-programs/2024-nssc-llnl-worksho p-on-nuclear-security-and-nonproliferation/.

¹⁸² Integrated Support Center for Nuclear Nonproliferation and Nuclear Security, *ISCN Newsletter*, No. 334, pp. 41-43.

¹⁸³ "WINS Academy Programmes," World Institute for Nuclear Security, https://www.wins.org/wins-academy.

¹⁸⁴ For basic information on the NSSC network, see: IAEA, "Understanding Nuclear Security Support Centres (NSSCs) in FIVE QUESTIONS," https://www.iaea.org/sites/default/files/20/08/nssc-five-questions.pdf.

¹⁸⁵ IAEA, Nuclear Security Review, p. 13.

¹⁸⁶ IAEA, Nuclear Security Review 2023, August 2023, p. 12, Appendix C, p. 1.

Asia Regional Network; the Hungary, Lithuania, Ukraine Consortium; the Latin America; and Southeast Asian Nations regional group.¹⁸⁷ In June 2024, an annual meeting of NSSC Network took place in Vienna.

The NSSC Network held a side event entitled "Building and Sustaining a Community of Practice: Overview and Experience of Members of the NSSC Network," and provided information on NSSC Network member engagement strategy, core function of a NSSC and the NSSC Network junior professional development program.¹⁸⁸

Regarding the human resource development efforts of the countries surveyed in 2024, Kazakhstan mentioned in its national statement at ICONS2024 that its nuclear security training center was operating successfully.¹⁸⁹ South Korea mentioned that it had held an international training course on nuclear security emergency response plans in May and a meeting of the NSSC network in Asia in July.¹⁹⁰ In Japan, ISCN of the JAEA hosted an international workshop on the establishment and operation of NSSCs, organized by the IAEA, in July. The workshop was attended by 23 participants from 14 countries. It was aimed at learning and discussing a systematic approach to the establishment and operation of NSSCs in IAEA member states. The participating countries included Iran, which is a surveyed country.¹⁹¹ These activities are based on the technical guidance document on establishing and operating NSSCs issued by the IAEA in 2020. The related activities of this technical guidance have become one of the focuses of the NSSC network's activities in recent years.¹⁹²

In other surveyed countries, in May, the Pakistan Centre of Excellence for Nuclear Security (PCENS) signed a practical agreement with the IAEA. This cooperation is expected to further strengthen training activities related to nuclear security in the region.¹⁹³

International network for education

The International Nuclear Security Education Network (INSEN) was established in 2010 to promote sustainable nuclear security education through a partnership between the IAEA and

¹⁸⁷ "The Chair's Report on the 2023 Annual Meeting of the International Network for Nuclear Security Training and Support Centres (NSSC Network)," IAEA, https://www.iaea.org/sites/default/files/23/06/chairs_report_annual_meeting_2023.pdf.

¹⁸⁸ "IAEA NSSC Network Newsletter," Issue 13, June 2024, https://us6.campaign-archive.com/?u=95 8dfcbed8f359a6db0bb9c87&id=8fb7c41bae.

¹⁸⁹ "Statement by Kazakhstan," ICONS2024.

¹⁹⁰ "Statement by South Korea," ICONS2024.

¹⁹¹ Integrated Support Center for Nuclear Nonproliferation and Nuclear Security, *ISCN Newsletter*, No. 333, September 2024, pp. 35-36.

¹⁹² Establishing and Operating a National Nuclear Security Support Centre (IAEA-TDL-010), IAEA, https://www.iaea.org/publications/14704/establishing-and-operating-a-national-nuclear-security-support-centre.

¹⁹³ "Statement by Pakistan," IAEA 68th General Council.

educational and research institutions as well as other stakeholders.¹⁹⁴

As of August 2024, the INSEN had 220 institutions from a total of 72 countries.¹⁹⁵ According to the IAEA's *Nuclear Security Review 2024*, membership in INSEN increased by seven institutions from six countries and one observer institutions in 2023.¹⁹⁶ Among the countries covered by this survey, institutions from Brazil, Canada, France, Germany, India, Japan, Kazakhstan, the Netherlands, Pakistan, Russia, South Africa, Sweden, Turkey, the United Kingdom and the United States participated. As a new participant from the surveyed countries, ISCN of Japan became a member on May 2, 2024.¹⁹⁷

In 2023, there was an increase in the number of INSEN members offering new degree programs in nuclear security — from 7.69% in 2022 to 7.94% in 2023. There was also an increase in the number of INSEN members teaching courses on nuclear security in existing programs, from 47.69% in 2022 to 53.97% in 2023.¹⁹⁸

F) Nuclear security plan and nuclear security fund

The IAEA developed a comprehensive action plan, called the Nuclear Security Plan, for protection against nuclear terrorism, which was approved by the Board of Governors in March 2002, marking its first-ever initiative in this regard. To facilitate the implementation of this plan, the Nuclear Security Fund (NSF) was established in the same year. Since then, IAEA Member States have been requested to contribute funds on a voluntary basis. Subsequent "Nuclear Security Plans" have been developed every four years since 2005, and activities in 2023 were carried out based on the sixth plan adopted in 2021,¹⁹⁹ covering the period from 2022 to 2025.

The NSF is sustained through voluntary contributions from IAEA Member States and others. In paragraph 13 of the IAEA Nuclear Security Resolution adopted in 2024, it calls upon all IAEA Member States "to consider providing the necessary political, technical, and financial support, as appropriate, to the Agency's efforts to enhance nuclear security

¹⁹⁴ IAEA, "International Nuclear Security Education Network (INSEN)," https://www.iaea.org/ services/networks/insen. Their work includes the development of peer-reviewed teaching materials; faculty development in different areas of nuclear security; joint research activities; student exchange programmes; academic theses supervision and evaluation; knowledge management; promotion of nuclear security education; and other related activities.

¹⁹⁵ IAEA, Nuclear Security Review 2024, August 2024, p. 13.

¹⁹⁶ Ibid.

¹⁹⁷ "Recent Trends and Initiatives of ISCN (ICONS2024; Joining IAEA/INSEN; and Opening Ceremony for ISCN Training Field)," 26th Nuclear Non-proliferation and Nuclear Security Working Group, Ministry of Education, Culture, Sports, Science and Technology, 2 June 13, 2024, https://www.mext.go.jp/content/20240814-mxt_kaisen-000037544_2.pdf. (in Japanese)

¹⁹⁸ IAEA, Nuclear Security Review 2024, pp. 12-13.

¹⁹⁹ IAEA, Nuclear Security Plan 2022-2025: Report by the Director General, GC (65)/24, September 15, 2021.

through various arrangements at the bilateral, regional, and international levels."²⁰⁰ Also in the co-presidents' statement of the ICONS2024 stated "recognize the Nuclear Security Fund as an important instrument for the Agency's activities in the field of nuclear security," and "continue to provide, on a voluntary basis, funds to the Nuclear Security Fund, as well as technical and human resources, as appropriate for the IAEA to implement its work in nuclear security and to provide, upon request, the support needed by Member States."²⁰¹

According to the *LAEA Nuclear Security Review 2024*, contributions or pledges to the NSF were made in 2023 by 15 countries, including 12 countries subject to this survey (Belgium, China, Finland, France, Germany, Japan, South Korea, Pakistan, Russia, Switzerland, the United Kingdom, and the United States).²⁰²

Forty-eight IAEA Member States, the European Union, and governmental and non-governmental organizations have contributed to the NSF since its establishment. Specifically, 24 of those donors have contributed to the NSF in the past five years (2019–2023), with six donors contributing once, 14 donors contributing two to four times, and five donors contributing five or more times. Contributions from donors contributing five or more times accounted for 67% of the total amount received in the past five years.²⁰³

Note that NSF revenue in 2023 was 23 million euros, about 6 million euros less than the previous year and the lowest in recent years.²⁰⁴

According to the IAEA, it still requires a significant amount of funding in order to implement a number of activities that have been identified as Member State priorities.

The *Nuclear Security* Review 2024 included a graph showing areas of activity that were lacking funding. According to this, there was a funding shortfall of over 18 million euros for the security of nuclear materials and nuclear facilities, over 8 million euros for the security of materials out of regulatory control, and over 2 million euros for program development and international cooperation.²⁰⁵

In the national statement at ICONS2024, Canada stated "the Nuclear Security Fund is financing important capacity-building using voluntary funds. This is essential work in nuclear security, and we strongly

²⁰⁰ IAEA, "Nuclear Security Resolution," September 2024, p. 6.

²⁰¹ "Statement by the Co-Presidents of the International Conference on Nuclear Security 2024: Shaping the Future," https://www.iaea.org/sites/default/files/24/05/cn-321_co-presidents_statement.pdf.

²⁰² IAEA, Nuclear Security Review 2024, p. 33.

²⁰³ Ibid, p. 34.

²⁰⁴ The contribution amounts for the past five years are: 33 million euros in 2018; 38 million euros in 2019; 45 million euros in 2020; 34 million euros in 2021; and 29 million euros in 2022.

²⁰⁵ IAEA, Nuclear Security Review 2024, p. 36.

encourage other states to contribute to the NSF."²⁰⁶

G) Participation in international efforts

International efforts to raise the level of nuclear security today form a multilayered structure. Major efforts by the international community in nuclear security include support for implementation of UN Security Council Resolution 1540 (2004) and multilateral forums such as the IAEA ICONS and the Nuclear Security Summit Process, which ended in 2016. Also, there are efforts by the G7 and the Global Initiative to Combat Nuclear Terrorism (GICNT) as a framework for multilateral cooperation on nuclear security.

UN Security Council Resolution 1540

Adopted in 2004, Security Council Resolution 1540, it decided that states should take effective measures to establish and strengthen national control systems to prevent the proliferation of nuclear, chemical, and biological weapons and their means of delivery, and calls for the development and maintenance of appropriate and effective measures of physical protection for that purpose.²⁰⁷ States are requested to submit reports to the United Nations on the obligations called for in this resolution. The submission of such reports will increase transparency regarding the nuclear security measures taken by states and contribute to international assurance regarding the implementation of such measures. See Table 3-6 for the status of submission of this report by the countries covered by this survey. Only Saudi Arabia submitted an updated report in 2024, and no new reports were submitted from the countries surveyed.

IAEA International Conference on Nuclear Security (ICONS)²⁰⁸

The fourth conference, entitled "ICONS 2024: Shaping the Future," was held from May 20th to 24th, 2024.

The ministerial session of ICONS2024 included national statements from 99 countries, three joint statements, and statements from two international organizations. There was also a panel discussion on the theme of "Securing Sustainable Progress: the Important Role of Nuclear Security in Advancing the Sustainable Development Goals," an event for ministers and representatives of each country entitled "Beyond Borders — A Collaborative Discourse on the Future of Nuclear Security," and a session on the

²⁰⁶ "Statement by Canada," ICONS2024.

²⁰⁷ UN Security Council, "Resolution 1540 (2004)," S/RES/1540 (2004), April 28, 2004.

²⁰⁸ ICONS has its origins in a ministerial-level meeting held in 2013 to maintain momentum for international efforts through the high-level political commitment brought about through the Nuclear Security Summit process. Subsequently, the second meeting took place in 2016, and it has been convened every four years since then. ICONS serves as a crucial platform, providing an opportunity for countries to announce their achievements and new commitments in the field of nuclear security. ICONS also allows countries to announce additional financial, human resources, and technical contributions to support these efforts.

universalization of important legal instruments on nuclear security.²⁰⁹

One of the three joint statements mentioned above promoted the role of nuclear security in the use of nuclear energy. It was submitted by 28 countries, including the following that are surveyed in this report: Canada, Finland, France, Israel, Japan, Kazakhstan, South Korea, the Netherlands, Sweden, Turkey, the UAE, the United Kingdom and the United States. The joint statement made the following recommendations for developing and strengthening national nuclear security infrastructure:²¹⁰

- "Establish provisions to effectively address nuclear security considerations applicable to nuclear material, other radioactive material, and associated facilities and activities under a State's jurisdiction through national legal and regulatory frameworks";
- "Leverage the IAEA and regional institutions to share best practices and lessons learned regarding the integrity and security of national nuclear security infrastructure, and implement effective and comprehensive nuclear security...at the national, local, and site levels"
- "Take into consideration the recommendations contained in the non-legally binding IAEA's Nuclear Security Series...taking nuclear security into account at all stages in the life cycle of nuclear facilities from design,

siting, construction, operation, and decommissioning,"

- "Integrate nuclear security principles across all three phases: (1) Before launching a nuclear power programme, (2) preparatory work for the contracting and construction, and (3) activities to contract, license and construct are undertaken," and,
- "To prepare for the new generation of advanced and small modular reactors and ease the regulatory burden on customer States through bilateral or multilateral cooperation, encourage vendor and supplier nations to demonstrate that security by design principles have been considered in the design phase."

The United States said that "[the joint statement] will be open for all Member States to subscribe to the goals and commitments as described."²¹¹

A ministerial declaration, had been adopted at every previous ICONS, was not adopted at ICONS2024 due to opposition from Iran. Iran argued that "initiatives like the International Conference on Nuclear Security (ICONS) have played a pivotal role in fostering dialogue. However, despite commendable efforts, ICONS and similar forums have faced criticism for their limited inclusivity, uneven implementation of recommendations, and challenges in translating discussions into tangible actions." In addition, Iran has proposed to

²⁰⁹ IAEA Nuclear Security Report 2024, P. 4.

²¹⁰ INFCIRC/1217, June 6, 2024.

²¹¹ Ibid.

enhance the operational and applicative aspect of ICONS by action-oriented agenda; urgency of existing threats; establishment of office for confidentiality and security"; holding practical workshops and training; sharing knowledge and best practices; Inclusive Participation from both of nuclear weapon states and nonnuclear weapon states; and commitment to implementation and follow-up mechanism.²¹²

In response to the lack of agreement to the draft ministerial declaration, Japan, the United Kingdom and other countries surveyed expressed their disappointment in their national statements. On the other hand, the G7 *NSSG report* published in June emphasized that "the lack of agreement does not diminish the value of the previous commitments to enhance global nuclear security."²¹³

In light of the failure of adopting a ministerial declaration, Australia and Kazakhstan, the co-presidents of ICONS2024 issued the co-presidents' statement as the outcome document.²¹⁴ The 28-paragraph statement refers to various challenges related to nuclear security, including the nuclear security challenges posed by emerging technologies, the universalization of

various related international conventions, computer security, human resource development, and the request for the IAEA to formulate the next nuclear security plan in consideration of this statement. In addition, in the statement, the IAEA was requested to continue holding the ICONS every four years and to promote participation at the ministerial level by all member states.²¹⁵ Many countries expressed their alignment and support for the co-presidents' statement.

In addition to the ministerial-level session, another pillar of ICONS was policy discussions on nuclear security and technical sessions on specialized scientific, technological, legal and regulatory issues.

In this session discussions and information exchanges took place on cross-cutting topics such as policy and regulation, technology and infrastructure for prevention, detection and response, capacity building, international cooperation and nuclear security culture.²¹⁶ In addition, in the spirit of the ICONS2024's theme of "Shaping the Future," a "Nuclear Security Delegation for the Future" was formed by 24 university students and early career professionals.²¹⁷

²¹² "Statement by Iran," ICONS2024.

²¹³ 2024 NSSG Report, p. 3.

²¹⁴ The Co-Presidents' Statement was developed following a series of open-ended working group and small group meetings held in Vienna from February to May 2024. IAEA *Nuclear Security Report2024* p. 4.

²¹⁵ "Statement by the Co-Presidents of the International Conference on Nuclear Security 2024: Shaping the Future," https://www.iaea.org/sites/default/files/24/05/cn-321_co-presidents_statement.pdf.

²¹⁶ "International Conference on Nuclear Security: Shaping the Future," IAEA, https://www.iaea.org/e vents/icons2024.

²¹⁷ 52 technical sessions were held by 89 member states and invited organizations, and 367 papers and 60

Nuclear Security Summit Process²¹⁸

The Nuclear Security Summit Process ended in 2016, but efforts have continued after the process ended through the Nuclear Security Contact Group (NSCG), which was established based on the Joint Statement on Sustained Action to Strengthen Global Nuclear Security. However, no public information on new participating countries or its specific activities in recent years could be found.

As for the "Basket Initiative,"²¹⁹ which launched at the Nuclear Security Summit Process, in which volunteer states promote initiatives through joint statements on specific themes, efforts are underway regarding the "Insider Threat Mitigation (INFCIRC/908)" led by the United States. In February, Lithuania joined the INFCIRC/908 initiative. As of November 2024, the number of participating countries had totaled 36.²²⁰ As mentioned above, a revised version of INFCIRC/908 was submitted in August 2024, and efforts are continuing.

GICNT²²¹

The GICNT is an important multinational initiative for enhancing global capabilities in nuclear security, involving 89 countries, including numerous developing nations, as well as international organizations such as the IAEA, INTERPOL, and the United Nations Office of Counter-Terrorism (UNOCT). The initiative actively engaged in practical activities such as training and workshops, and the development of practical guidelines. All countries under this survey except Iran, North Korea, and South Africa have participated in the GICNT. However, as of November 2024, the initiative appears to have temporarily suspended its official meetings and working group activities in response to Russia's invasion of Ukraine in February 2022.

<u>G7</u>

The G7's initiatives related to nuclear security include the G7 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (G7GP),²²² the NPDG, the NSSG, and the Nuclear and Radiological

posters were presented. IAEA, Nuclear Security Report 2024. p. 4.

²¹⁸ Launched in 2010 at the initiative of the U.S. President Barack Obama, it has been held a total of four times by 2016 (2012 in South Korea, 2014 in the Netherlands and 2016 in the U.S.).

²¹⁹ Other initiatives include Transportation Security (INFCIRC/909), in which Japan is the lead country; Minimizing and Eliminating the Use of HEU for Civilian Use (INFCIRC/912); and Nuclear Forensics (INFCIRC/917), in which Australia is the lead country. "What Are INFCIRCs?" Nuclear Threat Initiative, https://www.ntiindex.org/story/what-are-nuclear-security-infcircs/.

²²⁰ "INFCIRC/908: Joint Statement on Mitigating Insider Threats," https://insiderthreatmitigation.org/ infcirc_908.

²²¹ The initiative, jointly announced by Russia and the United States at the 2006 G8 St. Petersburg Summit, aims to counter the threat of nuclear terrorism through international efforts.

²²² The initiative was agreed at the 2002 Kananaskis Summit (Canada) by the then G8, including Russia, with the main objective of preventing the proliferation of WMDs and related substances, etc. Currently, the G7 is leading the initiative, with 30 countries and the EU participating.

Working Group (NRSWG). The following is a summary of their respective activities in 2024.

The NPDG issued a statement at its meeting in April and stated that "international community to remain vigilant against the threat of nuclear materials falling into the hands of terrorists and non-state actors," and "commits itself to promoting full implementation by all States of the highest standards of nuclear safety, security, and safeguards consistent with IAEA standards and guidance."²²³

In June, the NSSG published a report on the results of Italy's G7 Presidency. In addition to the contents mentioned in the previous sections, the 2024 NSSG Report also referred to the need to continue the evaluations of the potential risks of advanced reactors and SMRs, and to ensure nuclear security in the context of diversifying supply chains.²²⁴

Regarding the G7GP and the NRSWG, as of December 2024, there were no confirmed activities related to nuclear security.²²⁵

²²³ G7, "Statement of the G7 Non-Proliferation Directors Group," April 19, 2024.

²²⁴ 2024 NSSG Report, p.2, 4.

²²⁵ In June 2024, the G7 Global Partnership launched the "Countering WMD Disinformation: A Global Partnership Initiative," funded by the Department of Foreign Affairs of Canada, with the aim of detecting, analyzing and anticipating WMD-related disinformation, understanding impact and policy approaches, raising awareness and building capacity. "Countering WMD Disinformation: A Global Partnership Initiative," Global Partnership Website, https://www.gpwmd.com/countering-wmd-disinformation.

Part II: Evaluation

Country-by-Country Analysis

Evaluation Points and Criteria

In this "Evaluation" part, the performances of the 36 countries surveyed in this project are evaluated numerically in three areas—that is, nuclear disarmament, non-proliferation and nuclear security—based upon study and analysis compiled in the "Report" section.

Evaluations of the four groups-nuclearweapon states (NWS), non-parties to the Nuclear Non-Proliferation Treaty (NPT), non-nuclear-weapon states (NNWS), and one particular state (North Korea)-are made separately because of their different characteristics. Since different sets of criteria are applied to different groups of countries, full points differ according to the group each country belongs to. Then, as a measure to visualize a comparison of the 36 countries' relative performances, each country's performance in each area is shown on a chart in percentage terms.

The following lists the point values and scale of measurement of each evaluation criteria.

Groups	(1) NWS	(2) Non-NPT Parties	(3) NNWS	(4) Other
Areas	China France Russia U.K. U.S.	India Israel Pakistan	Australia, Brazil, Canada, Germany, Iran, Japan, Kazakhstan, South Korea, Mexico, Netherlands, Norway, South Africa, Sweden, Switzerland, Turkey Nuclear disarmament and non-proliferation: Austria, Egypt, Indonesia, New Zealand, Poland, Saudi Arabia, Syria <u>Nuclear security</u> : Belgium, Finland, UAE	North Korea*
Nuclear Disarmament	109	106	48	106
Nuclear Non-Proliferation	47	43	61	61
Nuclear Security	38	38	38	38

[Full points for each group of countries]

*North Korea declared its suspension from the NPT in 1993 and its withdrawal in 2003, and has conducted totally six nuclear tests in 2006, 2009, 2013, 2016 (twice) and 2017. However, there is no agreement among the states parties on North Korea's official status under the NPT.

[Nuclear Disarmament]

Evaluation criteria	Maximum points	Scale of measurement
1. Status of Nuclear Forces (estimates)	-20	
Status of nuclear forces (estimates)	(-20)	$\begin{array}{c} -5 (\sim 50); -6 (51 \sim 100); -8 (101 \sim 200); -10 (201 \sim 400); \\ -12 (401 \sim 1,000); -14 (1,001 \sim 2,000); -16 (2,001 \sim 4,000); -17 (4,001 \sim 6,000); -19 (6,001 \sim 8,000); -20 \\ (8,001 \sim) \end{array}$
		(not applicable to the NNWS)
2. Commitment to Achieving a World without Nuclear Weapons	9	
A) Voting behavior on UNGA resolutions on nuclear disarmament proposals by Japan, NAC and NAM	(6)	On each resolution: 0 (against); 1 (abstention); 2 (in favor)
B) Announcement of significant policies and important activities	(3)	Add 1 point for each policy, proposal and other initiatives having a major impact on global momentum toward a world without nuclear weapons (maximum 3 points)
C) Actions that run counter to nuclear disarmament	(-3)	Deduct 1~3 points for actions that run counter to nuclear disarmament, excluding actions evaluated under other items
3. Humanitarian Consequences of Nuclear Weapons	5	
A) Voting behavior on UNGA resolutions	(2)	On each resolution: 0 (against); 0.5 (abstention); 1 (in favor)
B) Participation in joint statements and international conferences	(1)	Add 0.5 point on each participation in joint statements and international conferences on humanitarian consequences of nuclear weapons
C) Victim assistance and environmental remediation	(2)	Add 1 point on each implementation and initiative regarding victim assistance and environmental remediation—including, 0 (against); 0.5 (abstention); 1 (in favor) for the UNGA resolution
4. Treaty on the Prohibition of Nuclear Weapons (TPNW)	10	
A) Signing and ratifying the TPNW	(7)	0 (not signing); 3 (not ratifying); 7 (ratifying) As for non-signing states, add 1 point for participating in meetings as observers
B) Voting behavior on UNGA resolutions on TPNW	(1)	0 (against); 0.5 (abstention); 1 (in favor)
C) Voting behavior on for legally binding UNGA resolutions on prohibition of nuclear weapons	(2)	On each resolution: 0 (against); 0.5 (abstention); 1 (in favor)
5. Reduction of Nuclear Weapons	22	
A) Reduction of nuclear weapons	(15)	 Add 1~10 points in accordance with the decuple rate of reduction from the previous fiscal year for a country having declared the number of nuclear weapons For a country having not declared it, add some points using the following formula: (the previous target – the latest target)÷the estimated number of nuclear weapons×10 Add 1 (engaging in nuclear weapons reduction over the past 5 years); add 1 (engaging in nuclear weapons reduction under legally-binding frameworks such as New Strategic Arms Reduction Treaty); add 1

Evaluation criteria	Maximum points	Scale of measurement
		 (announcing further reduction plan and implementing it in 2023) Give a full score (15 points) in case of the total abolition of nuclear weapons 1 (increase of the number of possessed nuclear weapons in the past five years without any reductions)
		(not applicable to the NNWS)
B) Concrete plans for further reduction of nuclear weapons	(3)	0 (no announcement on a plan of nuclear weapons reduction); 1 (declaring a rough plan of nuclear weapons reduction); 2 (declaring a plan on the size of nuclear weapons reduction); 3 (declaring a concrete and detailed plan of reduction)
		(not applicable to the NNWS)
C) Trends on strengthening/modernizing nuclear weapons capabilities	(4)	0 (modernizing/reinforcing nuclear forces in a backward move toward nuclear weapons reduction); 2 \sim 3 (modernizing/reinforcing nuclear forces which may not lead to increasing the number of nuclear weapons); 4 (not engaging in nuclear modernization/reinforcement)
		(not applicable to the NNWS)
6. Diminishing the Roles and Significance of Nuclear Weapons in National Security Strategies and Policies	12	
A) Current status of the roles and significance of nuclear weapons	(-8)	Deduct 6 points for reliance on nuclear weapons for their national security, and deduct 2 points for actions such as threats with nuclear weapons
		(not applicable to the NNWS)
B) Commitment to no first use, "sole purpose," and related doctrines	(3)	0 (not adopting either policy); 2 (adopting a similar policy or expressing its will to adopt either policy in the future); 3 (already adopting either policy) Deduct 2 points for actions that violate the commitment and 1 point for words and deeds that raise doubts about the commitment
		(not applicable to the NNWS)
C) Negative security assurances	(2)	0 (not declaring); 1 (declaring with reservations); 2 (declaring without reservations) Deduct 2 points for actions that violate the commitment and 1 point for words and deeds that raise doubts about the commitment
		(not applicable to the NNWS)
D) Voting behavior on UNGA resolutions on legally binding security assurances for NNWS	(1)	0 (against); 0.5 (abstention); 1 (in favor)
E) Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	(3)	Add 0.5 point for the ratification of one protocol; a country ratifying all protocols marks 3 points
		(not applicable to countries except NWS)
F) Relying on extended nuclear deterrence	(-5)	(not applicable to the NWS and Non-NPT Parties)
		(applied solely to the NNWS): -5 (a country relying on the nuclear umbrella and participating in nuclear sharing); -3 (a country relying on the nuclear umbrella); 0 (a country not relying on the nuclear umbrella)
G) Nuclear risk reduction	(3)	NWS and Non-NPT Parties: Add 1~2 points for implementing concrete measures for nuclear risk

Evaluation criteria	Maximum points	Scale of measurement
		reduction, add another 1 point for proposals and initiatives.
		NNWS: 1 point for proposals and initiatives.
H) Actions that increases nuclear risk	(-3)	Deduct 3 points for actions that increases nuclear risk
7. De-alerting or Measures for Maximizing Decision Time to Authorize the Use of Nuclear Weapons	4	
De-alerting or measures for maximizing decision time to authorize the use of nuclear weapons	(4)	$0 \sim 1$ (maintaining a high alert level); 2 (maintaining a certain alert level); 3 (de-alerting during peacetime); add 1 point for implementing measures for increasing the credibility of (lowered) alert status
		(not applicable to the NNWS)
8. CTBT	12	
A) Signing and ratifying the CTBT	(4)	0 (not signing); 2 (not ratifying); 4 (ratifying)
B) Moratoria on nuclear test explosions pending CTBT's entry into force	(3)	0 (not declaring); 2 (declaring); 3 (declaring and closing nuclear test sites)
		(not applicable to the NNWS)
C) Voting behavior on UNGA resolutions on CTBT	(1)	0 (against); 0.5 (abstention); 1 (in favor)
D) Cooperation with the CTBTO Preparatory Commission	(2)	0 (no cooperation or no information); $1\sim2$ (paying contributions, actively participating in meetings, and actively engaging in outreach activities for the treaty's entry into force)
E) Contribution to the development of the CTBT verification systems	(2)	Add 1 point for establishing and operating the IMS; add another 1 point for participating in the discussions on enhancing the CTBT verification capabilities
F) Nuclear testing	(-3)	-3 (conducting nuclear test explosions in the past 5 years);-1 (conducting nuclear tests without explosions or tests with unclear status); 0 (not conducting any nuclear tests)
		(not applicable to the NNWS)
9. FMCT	10	
A) Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	(4)	Add 1 (expressing a commitment); add $1 \sim 2$ (actively engaging in the promotion of early commencement); add $1 \sim 2$ (making concrete proposals on the start of negotiations)
B) Voting behavior on UNGA resolutions on an FMCT	(1)	0 (against); 0.5 (abstention); 1 (in favor)
C) Moratoria on the production of fissile material for use in nuclear weapons	(3)	0 (not declaring); 1 (not declaring but not producing fissile material for nuclear weapons); 2 (declaring); 3 (declaring and taking measures for the cessation of production as declared)
		(not applicable to the NNWS)
D) Contribution to the development of verification measures	(2)	0 (no contribution or no information); 1 (proposing research on verification measures); 2 (engaging in R&D for verification measures)
10. Transparency in Nuclear Forces, Fissile Material for Nuclear Weapons, and Nuclear Strategy/Doctrine	6	

Evaluation criteria	Maximum points	Scale of measurement
Transparency in nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine	(6)	Add $1\sim2$ (disclosing the nuclear strategy/doctrine); add $1\sim2$ (disclosing the status of nuclear forces); add $1\sim2$ (disclosing the status of fissile material usable for nuclear weapons)
		(not applicable to the NNWS)
11. Nuclear Disarmament Verifications	7	
A) Acceptance and implementation of nuclear disarmament verification	(3)	0 (not accepting or implementing); 2 (limited acceptance and implementation); 3 (accepting and implementing verification with comprehensiveness and completeness); deduct 1~2 points in case of non-compliance or problems in implementation
		(not applicable to the NNWS)
B) Engagement in research and development for verification measures of nuclear disarmament	(1)	0 (not engaging or no information); 1 (engaging in R&D)
C) The IAEA inspections to fissile material declared as no longer required for military purposes	(3)	0 (not implementing); 1(limited implementation); 3 (implementing); add 1 point if a country engages in efforts for implementing or strengthening implementation, except in the case of already implementing
		(not applicable to the NNWS)
12. Irreversibility	7	
A) Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	(3)	0 (not implementing or no information); 1 (perhaps implementing but not clear); $2\sim 3$ (implementing)
Vendes		(not applicable to the NNWS)
B) Decommissioning/conversion of nuclear weapons-related facilities	(2)	0 (not implementing or no information); 1 (implementing in a limited way); 2 (implementing extensively)
		(not applicable to the NNWS)
C) Measures for fissile material declared excess for military purposes, such as disposition or conversion to peaceful	(2)	0 (not implementing or no information); 1 (implementing in a limited way); 2 (implementing extensively)
purposes		(not applicable to the NNWS)
13. Disarmament and Non-Proliferation Education and Cooperation with Civil Society	4	
Disarmament and non-proliferation education and cooperation with civil society	(4)	Add 1 (reference in the NPT Review Process and other fora, participation in joint statements; reference to gender issues, participation in joint statements; implementation of disarmament and non-proliferation education; cooperation with civil society); maximum 4 points
14. Hiroshima and Nagasaki Peace Memorial Ceremonies	1	
Hiroshima and Nagasaki Peace Memorial Ceremonies	(1)	0 (not attending); 0.5 (not attending in 2021 but has attended at least once during the past 3 years); 1 (attending any one of the ceremonies)

[Nuclear Non-Proliferation]

Evaluation criteria	Maximum points	Scale of measurement
1. Acceptance and Compliance with Nuclear Non-Proliferation Obligations	20	
A) Accession to the NPT	(10)	0 (not signing or declaring withdrawal); 3 (not ratifying); 10 (in force); 0 point for declaring withdrawal after accession
B) Compliance with Articles I and II of the NPT and the UNSCRs on non-proliferation	(7)	0 (not complying with Articles I and II of the NPT); 3 \sim 4 (having not yet violated Articles I and II of the NPT but displaying behaviors that raise concerns about proliferation, or not complying with the UNSCRs adopted for relevant nuclear issues); 5 (taking concrete measures for solving the non-compliance issue); 7 (complying)
		As for the non-NPT states (maximum 3 points); 2 (not complying with the UNSCRs adopted for relevant nuclear issues); 3 (other cases)
C) Nuclear-Weapon-Free Zones	(3)	1 (signing the NWFZ treaty); 3 (ratifying the treaty)
D) Actions that run counter to nuclear non- proliferation	(-4)	Deduct 1~4 points for actions that run counter to nuclear non-proliferation, although they do not violate NPT
2. IAEA Safeguards Applied to the NPT NNWS	18	
A) Signing and ratifying a Comprehensive Safeguards Agreement	(4)	0 (not signing); 1 (not ratifying); 4 (in force)
B) Signing and ratifying an Additional Protocol	(5)	0 (not signing); 1 (not ratifying); 3 (provisional application); 5 (in force)
C) Implementation of the integrated safeguards	(4)	0 (not implementing); 2 (broader conclusion) 4 (implementing)
D) Compliance with IAEA Safeguards Agreement	(5)	0 (not resolving the non-compliance issue); 2 (taking concrete measures for solving the non- compliance issue); 5 (complying)
3. IAEA Safeguards Applied to NWS and Non-Parties to the NPT	7	
A) Application of the IAEA safeguards (Voluntary Offer Agreement or INFCIRC/66) to their peaceful nuclear in facilities	(3)	0 (not applying); 1 (applying INFCIRC/66); 2 (applying Voluntary Offer Agreement); add 1 point if all civilian nuclear facilities are designated as eligible facilities or are subject to safeguards
B) Signing, ratifying, and implementing an Additional Protocol	(4)	0 (not signing); 1 (not ratifying); 3 (in force); add 1 point if widely applied to peaceful nuclear activities
4. Cooperation with the IAEA	4	
A) Cooperation with the IAEA	(4)	Add 1 (contributing to the development of verification technologies); add $1 \sim 2$ (contributing to the universalization of the Additional Protocol); add 1 (other efforts)
B) Behaviors impeding IAEA activities	(-2)	Deduct 1~2 points for impeding IAEA activities
5. Implementing Appropriate Export Controls on Nuclear-Related Items and Technologies	15	
A) Establishment and implementation of the national control systems	(5)	0 (not establishing); 1 (establishing but insufficient); 2 (establishing a system to a certain degree); 3 (establishing an advanced system, including the Catch-

Evaluation criteria	Maximum points	Scale of measurement
		all); add $1 \sim 2$ (if continuing to implement appropriate export controls); deduct $1 \sim 2$ (not adequately implementing)
B) Requiring the conclusion of an Additional Protocol for nuclear export	(2)	0 (not requiring or no information); 1 (requiring for some cases); 2 (requiring)
C) Implementation of the UNSCRs concerning North Korean and Iranian nuclear issues	(3)	0 (not implementing or no information); 2 (implementing); 3(actively implementing); deduct 1~ 3 (depending on the degree of violation)
D) Participation in the PSI	(2)	0 (not participating); 1 (participating); 2 (actively participating)
E) Civil nuclear cooperation with non-parties to the NPT	(3)	0 (exploring active cooperation); 1~2 (contemplating cooperation, subject to implementing additional nuclear disarmament and non-proliferation measures); 3 (showing a cautious attitude or being against it)
6. Transparency in the Peaceful Use of Nuclear Energy	4	
A) Reporting on the peaceful nuclear activities	(2)	0 (not reporting or no information); 1 (reporting but insufficiently); 2 (reporting)
B) Reporting on plutonium management	(2)	0 (not reporting or no information); 1 (reporting); 2 (reporting on not only plutonium but also uranium); add 1 (ensuring a high level of transparency in plutonium although not being obliged to report)

[Nuclear Security]

Evaluation criteria	Maximum points	Scale of measurement
1. The Amount of Weapon-Usable Nuclear Material and Possession of Relevant Facilities	-15	
A) The amount of weapon-usable nuclear material	(-13)	•HEU: -5 (100t or more); -4 (50t or more); -3 (10t or more); -2 (1t or more); -1 (possessing less than 1t) •Military separated Pu: -5 (50t or more); -4 (20t or more); -3 (5t or more); -2 (1t or more); -1 (possessing less than 1t) •Non-military separated Pu: -3 (70t or more); -2 (30t or more); -1 (possessing less than 30t)
B) Possession of facilities that could cause serious radiological effects	(-2)	•Power reactor(s): -1 •Reprocessing facility(ies): -1 Not the number of facilities, but their presence or absence. Does not include facilities under construction.
2. Status of Accession to Nuclear Security and Safety-Related Conventions and Their Application to Domestic Systems	20	
A) Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	(3)	0 (not signed the CPPNM); 1 (not ratified the CPPNM); 2 (Convention in force, but not ratified the A/CPPNM); 3 (both the CPPNM and the A/CPPNM in force)
B) International Convention for the Suppression of Acts of Nuclear Terrorism	(2)	0 (not signed); 1 (not ratified); 2 (in force)
C) Convention on Nuclear Safety	(2)	0 (not signed); 1 (not ratified); 2 (in force)

Evaluation criteria	Maximum points	Scale of measurement
D) Convention on Early Notification of a Nuclear Accident	(2)	0 (not signed); 1 (not ratified); 2 (in force)
E) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	(2)	0 (not signed); 1 (not ratified); 2 (in force)
F) Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	(2)	0 (not signed); 1 (not ratified); 2 (in force)
G) Enactment of laws and establishment of regulations for the national implementation	(3)	0 (not established domestic laws and regulations nor the national implementation system) 1: Establishment of CPPNM Implementation Authority 1: National Legal Framework for the A/CPPNM 1: Submission of information in accordance with Article 14.1
H) INFCIRC/225/Rev.5	(4)	0 (not applied or no information) • Average score of Security & Control Measures and Protect Facilities in the NTI Nuclear Security Index 2023 are used. 4 (80 points or above); 3 (60 points or above); 2(50 points and above); 1(35 points or above); 0 (Less than 35 points)
3. Efforts to Maintain and Improve the Highest Level of Nuclear Security	17	
A) Minimization of HEU in civilian use	(4)	0 (no effort or no information); 1 (limited efforts: efforts made in the past); 3 (active efforts); add 1 (commitment to further enhancement) Breakdown of 3 (active efforts): 2: Reduction in 2023 or complete removal in the past:
		1: Ongoing efforts (including technology development efforts)
B) Acceptance of international nuclear security review missions	(4)	0 (none or no information) 2: Accepted in 2023 (1: Announcement of future mission) 1: Acceptance of review mission within the last 5 years or accepted more than two missions in the past 1: Making part of mission report available to the public
C) Technology development—nuclear forensics	(2)	0 (no effort or no information); 1 (some efforts: Participation in ITWG, CMX, INFCIRC/917, etc.); 2 (active efforts: Implementation or announcement of major activities in 2023)
D) Capacity building and support activities	(2)	0 (not implemented or no information); 1 (implementing: establishment of COE or relevant organizations, participation in training courses, workshops, etc., regional and international support activities); 2 (actively implementing: new major activities in 2023)
E) IAEA Nuclear Security Plan and Nuclear Security Fund	(2)	0 (no contribution or information); 1 (made contributions: contributions made in 2023); 2 (made active contributions: continuous contributions (*points added if contributions have been made continuously over the years even if contributions cannot be confirmed in 2023))
F) Participation in international efforts	(3)	0 (no participation); 1 (participated in two or more frameworks); 2 (participated in four or more frameworks); add 1 point if contributing actively

Evaluation criteria	Maximum points	Scale of measurement
4. Responding to Nuclear Security Threats Posed by States	-2	
A) Commitment to international norms prohibiting attacks against nuclear facilities for peaceful uses, and strengthening of efforts	(1)	0 (none, no information); 1 (statement of commitment, proposal, etc.)
B) Attack against nuclear facilities	(-3)	0 (none); -3 (attacked nuclear facilities)

As for the evaluation section, a set of objective evaluation criteria is established by which the respective country's performance is assessed.

The Research Committee of this project recognizes the difficulties, limitations and risk of "scoring" countries' performances. However, the Committee also considers that an indicative approach is useful to draw attention to nuclear issues, so as to prompt debates over priorities and urgency.

The different numerical values within each category (i.e., nuclear disarmament, nuclear non-proliferation and nuclear security) reflect each activity's importance within that area, as determined through deliberation by the Research Committee of this project. However, the differences in the scoring arrangements within each of the three categories do not necessarily reflect a category's relative significance in comparison with others, as they have been driven by the differing number of items surveyed. Thus, the value assigned to nuclear disarmament (maximum of 109 points) does not mean that it is more than twice as important as nuclear nonproliferation (maximum of 61 points) or nuclear security (maximum of 38 points).

Regarding "the number of nuclear weapons" (in the Nuclear Disarmament section) and "the amount of fissile material usable for nuclear weapons" (in the Nuclear Security section), the assumption is that the more nuclear weapons or weapons-usable fissile material a country possesses, the greater the task of reducing them and ensuring their security. However, the Research Committee recognizes that "numbers" or "amounts" are not the sole decisive factors. It is definitely true that other factors-such as implications of missile defense, chemical and biological weapons, or conventional force imbalance and a psychological attachment to a minimum overt or covert nuclear weapon capability-would affect the issues and the process of nuclear disarmament, nonproliferation and nuclear security. However, they were not included in our criteria for evaluation because it was difficult to make objective scales of the significance of these factors. In addition, in view of the suggestions and comments made to the Hiroshima Report 2013, the Research Committee modified the criteria of the following items: current status of the roles and significance of nuclear weapons in national security strategies and policies; reliance on extended nuclear

deterrence; and nuclear testing.

In the end, there is no way to mathematically compare the different factors contained in the different areas of disarmament, non-proliferation and nuclear security. Therefore, the evaluation points should be taken as indicative of performances in general but by no means as an exact representation or precise assessment of different countries' performances. Since the *Hiroshima Report* 2014, such items as "relying on extended nuclear deterrence" and "nuclear testing" have been negatively graded if applicable.

Along with the adoption of the Treaty on the Prohibition of Nuclear Weapons (TPNW), its signature and ratification status was newly added to the evaluation item in the Hiroshima Report 2018. In addition, since the Hiroshima Report 2019, the Research Committee has added an evaluation item addressing whether the respective countries attended the Hiroshima or the Nagasaki Peace Memorial Ceremonies, while attendance at the Hiroshima Peace Memorial Ceremony alone had been evaluated until the Hiroshima Report 2018. (the maximum score in this item remains the same). Since the Hiroshima Report 2020, increase of the number of possessed nuclear weapons in the past five years without any reductions, and activities that are not covered by the existing evaluation items but contrary to nuclear disarmament and nonproliferation are negatively graded, if applicable. Furthermore, since the Hiroshima Report 2021, the Research Committee modified grading range as follows: grading range of negative

evaluation on actions against nuclear nonproliferation has been expanded; grading range on the International Atomic Energy Agency (IAEA) "Recommendations on the Physical Protection of Nuclear Material and Facilities (INFCIRC/225/Rev.5)," has been expanded and measures against insider threat and cyber threat have been positively evaluated; grading range on enactment of laws and establishment of regulations for national implementation has been expanded. In addition, not only efforts made in 2021 but also previous efforts have been evaluated.

Furthermore, in the *Hiroshima Report 2023*, the evaluation items and evaluation criteria were modified to reflect changes in the situation in light of new trends surrounding nuclear issues and the 10th NPT Review Conference (RevCon) and the TPNW First Meeting of States Parties (1MSP). The changes are described below. A comparison table with the previous year's evaluation items and criteria is also attached at the end of this report.

In the *Hiroshima* Report 2024, the Research Committee introduced new evaluation criteria concerning: voting behaviors on the UNGA resolution on victim assistance and environmental remediation; and whether nuclear-armed states have designated all their civilian nuclear facilities for IAEA safeguards.

For the NWS, radar charts were produced to illustrate where each country stands with respect to different aspects of nuclear disarmament. For this purpose, the 12 issues used for nuclear disarmament evaluation were grouped into six aspects: (1) the number of nuclear weapons, (2) reduction of nuclear weapons, (3) commitment to achieving a "world without nuclear weapons," (4) operational policy, (5) the status of signature and ratification of, or attitudes of negotiation to relevant multilateral treaties, and (6) transparency.

Modification of evaluation items and criteria in the *Hiroshima Report 2023*

Nuclear disarmament

- Commitment to achieving a world without nuclear weapons: "Actions that run counter to nuclear disarmament," which had been one of the evaluation criteria in "Important policy announcements and implementation of activities," was made an independent medium-term item, with no change in grade, but with the newly specified "excluding actions evaluated under other items" as the evaluation criteria.
- Humanitarian consequences of nuclear weapons
 - What had been evaluated as a middle item in "Commitment to achieving a world without nuclear weapons" was changed to an independent major item due to the increase in evaluation items based on the treatment under the TPNW and other factors.
 - The status of efforts regarding "participation in international conferences and joint statements" and "Victim assistance and environmental remediation" were

established as new sub-items.

► TPNW

- Signature and ratification of the TPNW: Participating as observers was added to the evaluation criteria following the holding of the First Meeting of the States Parties.
- Voting on three UNGA resolutions: split the evaluation item into one related to TPNW and one related to the other two (overall, no change in evaluation criteria)
- Diminishing the roles and significance of nuclear weapons in national security strategies and policies
 - Current status of the roles and significance of nuclear weapons: In light of the outbreak of acts of aggression under nuclear threat, in addition to the conventional reliance on nuclear weapons (points were reduced uniformly for nuclear powers), points were reduced for acts such as nuclear threats in the evaluation criteria. No change was made to the total score (point reduction) for the relevant evaluation item.
 - ♦ With regard to "no first use" and "negative security assurances," in order to clarify that actions, etc. that differ from the declared policy have occurred, points are deducted for actions that violate the commitment or words and deeds that raise doubts about the commitment, respectively.
 - In response to the fact that assurance of safety to non-nuclear weapons
 States has become an important issue,
 "Voting for a legally binding UNGA"

resolution on security assurances to non-nuclear-weapons States" was newly added as an evaluation item.

- In response to the fact that nuclear risk reduction has become an important issue, "nuclear risk reduction" was newly established as an evaluation item.
- CTBT: "Voting behaviors for a UN General Assembly resolution on the CTBT" was newly established to further clarify the situation surrounding the CTBT and the responses of countries under investigation.
- FMCT: "Voting behaviors for the UN General Assembly Resolution on an FMCT" was newly established to clarify the situation surrounding the FMCT and the responses of the countries surveyed.
- Disarmament and non-proliferation education, and cooperation with civil society: Based on the discussions at the 10th NPT Review Conference, the evaluation criteria were changed to "reference in the NPT Review Process and other fora, participation in joint statements; reference to gender issues, participation in joint statements; implementation of disarmament and non-proliferation education; cooperation with civil society" (No change to the total grade).

Nuclear non-proliferation

Compliance with nuclear nonproliferation obligations: "Actions contrary to nuclear non-proliferation," which had been one of the evaluation criteria for the middle item "Compliance with NPT Articles I and II and related Security Council resolutions," was set as an independent middle item (no change in grade).

Cooperation with the IAEA: In light of the occurrence of actions that impede IAEA safeguards, a point reduction was added to the evaluation item for "actions that impede the activities of the IAEA."

Nuclear security

- The amount of weapon-usable nuclear material
 - The base holding was revised so that the point reduction categories would be based on the current holdings of each country.
 - Plutonium classification was changed from "weapons-grade plutonium" to "military separated plutonium" and from "reactor-grade plutonium" to "non-military separated plutonium." Because it was difficult to collect data under the old classification name, the name was changed to one that is more commonly used and more stable today.
 - ☆ The item "Possession of facilities that could cause serious radiological effects" was added. This item was added in response to recent concerns about the risk of sabotage of nuclear facilities as well as the risk of theft of nuclear materials. In addition to commercial reactors and reprocessing facilities, there are other facilities that could have radiological consequences in the event of sabotage, but two were

selected as the main representative facilities that could have serious consequences.

- Enactment of laws and establishment of regulations for the national implementation
 - ✦ For the "IAEA Recommendations on the Physical Protection of Nuclear Material," in order to clarify the grading criteria and from the viewpoint of objective evaluation, the evaluation method was changed to use the score of the Nuclear Security Index of the Nuclear Threat Initiative (NTI), which is the most recognized worldwide.
 - Regarding "Establishment of laws and system," because evaluation is made focusing on the "Convention on the Physical Protection of Nuclear Material," which is the key convention among nuclear security-related conventions, it was moved to "2-G)" immediately after "F) Convention on Assistance to Nuclear Accidents," which is the last item in the series of conventions, rather than after the IAEA recommendation document.
 - Clarified the scoring criteria for "establishment of laws and institutions for domestic implementation."
- Efforts to maintain and improve the highest level of nuclear security
 - Removed "separated plutonium inventory" from "minimization of HEU and separated plutonium inventory for civilian use" (because separated plutonium inventory for civilian use is evaluated as "separated

plutonium for non-military use" under "Item 1"). In addition, the evaluation criteria for this evaluation item were clarified.

- "Prevention of illicit trafficking" was omitted due to difficulty in obtaining data for each country that would allow an objective assessment.
- Clarified the evaluation criteria for "acceptance of international evaluation missions."
- Clarified the evaluation criteria for "Technology Development - Nuclear Forensics."
- Clarified the evaluation criteria for "Human Resource Development/ Capacity Building and Support Activities."
- Clarified the evaluation criteria for "IAEA Nuclear Security Plan and Nuclear Security Fund."
- Clarified the evaluation criteria regarding "Participation in International Initiatives," and the international initiatives covered were revised and updated.
- "Response to Nuclear Security Threats Posed by States" was newly added (in response to Russia's attack against Ukraine's nuclear facilities).
Chapter 1 Area Summary

(1) Nuclear Disarmament

			· · ·								(Evalua	tion Ra	te
(Dainte (Full Dainte)	20 -10)		2	20 3	30 2	-0 8		»0	10 8	so s	10 	_
(Points/Fuil Points)			E 90/								Upper Lower	=2023 =2024	_
China (6.8/109)			6.2	%									
France (24.5/109)					21.6%	Ď							
Russia (-7.5/109)			-5.9% - 6.9%										
United Kingdom (22.5/109)					20.6% 20.6%								
United States (18.4/109)				17. 16	2% .9%								
India (4.0/106)			^{3.6%} 3.8%										
lsrael (-1.5/106)			-3.3% -1.4%										
Pakistan (-0.5/106)			1.1% - 0.5%										
Australia (22.0/48)							45.	19.0% 8%					
Austria (34.0/48)										70.8% 70.8%			
Brazil (31.5/48)									61.5%	.6%			
Canada (22.0/48)							41.7%	8%					
Eavpt (19.5/48)							40.6% 40.6%						_
Germany (19.5/48)							^{39.6%}						
Indonesia $(335/48)$									60.4%	69.8%			
lran (155/48)						29.2%				00,070			
anan (26.0/48)						02.07		54 2	3%				
$\frac{340}{(20.0)}$								54.2	/0	75.0%	70.2%		
South Koroa (20.5 / 48)							41.7%				19.2%		
							42.7%			75.09			
						36.	5%				/.1%		
							39.6%			74.0%			
New Zealand (37.5/48)							42.7%			7	8.1%		
Norway (20.0/48)						30.2%	41.7%						
Poland (15.0/48)					27	31.3%							
Saudi Arabia (15.5/48)						32.3%			C1 E9/				
South Africa (32.5/48)								2.0%	6	57.7%			
Sweden (20.0/48)							41.7%	.370	-				
Switzerland (28.0/48)								Į.	^{59.4%} 8.3%				
Syria (11.0/48)					25.09 22.99	0							
Turkey (12.5/48)					25.09 26	0%							
North Korea (-13.7/106)			-11.3% -12.9%										

6-point Nuclear Disarmament Radar Charts

According to the following radar charts illustrating where each nuclear-weapon state stands with respect to different aspects of nuclear disarmament, China is required to improve its efforts for nuclear weapons reduction and transparency. Russia and the United States are urged to undertake further reductions of their nuclear arsenals. The performances of France and the United Kingdom are relatively well-balanced, compared to the other NWS. Still, those two countries need to improve their efforts regarding reductions, commitments and operational policies.

Aspects	Issues
Number	♦ Number of nuclear weapons
Reduction	♦ Reduction of nuclear weapons
Commitments	 ☆ Treaty on the Prohibition of Nuclear Weapons (TPNW) ☆ Commitments to achieving a world without nuclear weapons ∻ Humanitarian consequences of nuclear weapons ∻ Disarmament and non-proliferation education and cooperation with the civil society ∻ Hiroshima and Nagasaki Peace Memorial Ceremonies
Operational policy	 ♦ Diminishing roles and significance of nuclear weapons in the national security strategies and policies ♦ De-alerting, or measures for maximizing decision time to authorize the use of nuclear weapons
Multilateral treaties	 ♦ Comprehensive Nuclear-Test-Ban Treaty (CTBT) ♦ Fissile Material Cut-off Treaty (FMCT)
Transparency	 ♦ Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine ♦ Verification ♦ Irreversibility









(Evaluation Rates) -10 0 10 20 30 40 50 60 80 90 100 70 (Points/Full Points) Upper=2023 Lower=2024 57 4% 57.4% China (27.0/47) 83.0% 85.1% France (40.0/47) 46.8% Russia (22.0/47)87.2% 85.1% United Kingdom (40.0/47) 83.0% United States (38.0/47) 34.9% 34.9% India (15.0/43) 27.9% 27.9% (12.0/43) Israel 18.6% 18.6% Pakistan (8.0/43) 91.8% 91.8% Australia (56.0/61) 85.2% 85.2% Austria (52.0/61) 70.5% 70.5% Brazil (43.0/61) 85.2% 85.2% Canada (52.0/61) 60.7% 60.7% Egypt (37.0/61) 91.8% 91.8% Germany (56.0/61) 78.7% **78.7%** Indonesia (48.0/61) 41.0% 41.0% Iran (25.0/61) 86.9% 86.9% Japan (53.0/61) 80.3% 80.3% Kazakhstan (49.0/61) 83.6% 83.6% South Korea (51.0/61) 82.0% 82.0% Mexico (50.0/61) 90.2% 90.2% Netherlands (55.0/61) 93.4% 93.4% New Zealand (57.0/61) 88.5% 88.5% Norway (54.0/61) 86.9% 86.9% Poland (53.0/61) 54.1% 54.1% Saudi Arabia (33.0/61) 88.5% 88.5% South Africa (54.0/61) 88.5% 88.5% Sweden (54.0/61) 86.9% 86.9% Switzerland (53.0/61) 32.8% Syria (21.0/61) 86.9% 86.9% Turkey (53.0/61) 0.0% **0.0%** North Korea (0.0/61)

(2) Nuclear Non-Proliferation

(3) Nuclear Security

	-	10	0 1	10 2	0 3	:0 4	40 !	50 6	50 5	70 8	(Evaluat) 80 9	ion Rate 0
(Pc	oints/Full Points)		1								Upper	=2023
China	(19.0/38)						4	7.4% 50.0%			Lower:	=2024 _
France	(20.0/38)						4	52.6%	6			
Russia	(6.0/38)			13.2%	8%				1			
United Kingdom	(23.0/38)								60.5%			
United States	(230/38)							52.6%	60.5%			
India	(100/38)				26.	3%			00.070			
Israel	(150/38)				20		39.5%					
Bakistan	(140/20)					31.6%	59.5%					
Australia	(14.0/ 30)					3	0.8%			73.7%		
Australia	(27.07.38)									71.1% 68.4%		
Beigium	(28.07 38)							5	7.9%	73.79	%	
Brazii	(22.0/38)							5	7.9%	-	78.9%	
Canada	(30.0/38)										78.9%	89.5%
Finland	(32.0/38)									79.7%	84.2	%
Germany	(29.0/38)									76	.3%	
Iran	(5.0/38)			13.2%	6							
Japan	(32.0/38)										81.6% 84.2	%
Kazakhstan	(27.0/38)								6	71.1%		
South Korea	(31.0/38)										84.2% 81.6%	
Mexico	(26.0/38)									71.1% 68.4%		
Netherlands	(32.0/38)										86.8 84.2	^{3%}
Norway	(27.0/38)									71.1%	81.6%	
South Africa	(20.0/38)						47	^{7.4%} 52.6%	ó			
Sweden	(30.0/38)										78.9% ^{86.8}	°6
Switzerland	(31.0/38)										84.2%	1
Turkev	(27.0/38)									58.4% 71.1%		
United Arab Emirates	(25.0/38)							5	7.9%	8%		
North Korea	(-1.0/38)		-2.6% - 2.6%									

Chapter 2

Country-by-Country Summary

(1) Nuclear-Weapon States

1. China Nuclear-Weapon State

Nuclear Disarmament	6.8 Points	Full Points 109	6.2%	
	Change compared to the Hiroshima Report 2024 0.5			

China is the only NWS that has not implemented substantial nuclear disarmament measures, asserting that its participation in the nuclear weapons reduction process is premature. It voted against the UNGA resolution on nuclear disarmament proposed by Japan. It has actively pursued modernization programs for its nuclear forces (ICBMs and SLBMs in particular). It is estimated to possess 500 nuclear warheads, and the pace of increase has been accelerating. It has been speculated that China would possess over 1,000 operational nuclear weapons within the next decade. For the first time in 40 years, China has conducted an ICBM launch test outside its borders (prior notification was given to countries such as the U.S.). In bilateral talks with the U.S., China acknowledged the need to maintain human control over the decision to use nuclear weapons. China opposes the TPNW and has not signed it. It has not yet ratified the CTBT. It voted against the UNGA resolution on an FMCT. It has not declared a moratorium on the production of fissile material for nuclear weapons, and concerns have been raised about the potential use of civilian nuclear facilities for military purposes. While China has declared a policy of no first use of nuclear weapons and unconditional negative security assurance, there are growing concerns that it is increasing the role of nuclear weapons in its national security, including through changes to such policies. Despite emphasizing the importance of transparency in intentions, China has maintained the least transparency regarding its nuclear weapon capabilities among the NWS and has not disclosed any information regarding its nuclear forces.

Nuclear Non-Proliferation	27 Points	Full Points 47	57.4%		
	Change compared to the Hiroshima Report 2024 0				

China acceded to the IAEA Additional Protocol, in which no provision for complementary access visits is stipulated. It opposes the acquisition of nuclear submarines by Australia under the trilateral security partnership between Australia, the U.K. and the U.S. (AUKUS). The country repeatedly defended North Korea's nuclear and missile activities at the United Nations Security Council (UNSC). Although China has stated that it has been engaged in the implementation of sanction measures vis-à-vis North Korea under the UNSC resolutions, violations on sanction measures also have been pointed out. China abstained from voting on the extension of the term of the UNSC's panel of experts on North Korea sanctions. China has also been criticized for exporting two nuclear power reactors to Pakistan, which may constitute a violation of the NSG guidelines. Since 2018, China has not submitted a report to the IAEA based on the Guidelines for the Management of Plutonium.

Nuclear Security	19 Points	Full Points 38	50.0%		
	Change compared to the Hiroshima Report 2024 1				

China has ratified all nuclear security-related conventions; and has established a national implementation system for the A/CPPNM. It is promoting capacity building through increased investment in nuclear security-related innovations. China hosted an IPPAS mission in 2017 and continues to contribute to the NSF. There is room for improvement in enhancing measures against insider threats and for cybersecurity. China hosted training courses on nuclear security at major public events and an international workshop on nuclear materials out of regulatory control.

2. France Nuclear-Weapon State

Nuclear Disarmament	24.5 Points	24.5 Points Full Points 109 22.5 %			
Nuclear Disarmanient	Change comp	pared to the Hiroshima	Report 2024 1		
France has announced that its maximum number of nuclear warheads is 300 and has reduced its overall nuclear forces. It has converted excess fissile material intended for military use to civilian purposes, placing it under international safeguards. It voted against most UNGA Resolutions on nuclear disarmament and abstained from voting on the resolution proposed by Japan. Along with the U.K and the U.S., France has expressed its commitment not to delegate the decision to use nuclear weapons to AI. France opposes the TPNW and has not signed it. It has ratified the CTBT and supports the early commencement of FMCT negotiations. France participates in the IPNDV.					
Nuclear Non Proliferation	40 Points	Full Points 47	85.1%		
Tructear Tron-Tronteration	Change comp	bared to the Hiroshima	Report 2024 1		
France acceded to the IAEA Additional Protocol, with the provision for complementary access visits. Its civilian nuclear material covered by the EURATOM Treaty is subject to its safeguards. France has proactively engaged in nuclear non-proliferation, including contributions to the IAEA safeguards systems, and the establishment and implementation of its export control systems. France mentioned the conditions for the supply of nuclear-related equipment and technology in the IAEA Safeguards Additional Protocol. France submitted a report based on the Guidelines for the Management of Plutonium to the IAEA, including its holding of civil HEU in addition to that of civil plutonium.					
Nuclear Security	20 Points	Full Points 38	52.6%		
i vueicai occurity	Change compared to the Hiroshima Report 2024 2				
France has ratified all nuclear security-related conventions and has established a national implementation system for the A/CPPNM France hosted the IPPAS mission in 2018 and					

implementation system for the A/CPPNM. France hosted the IPPAS mission in 2018 and announced it will host another one in 2027. Its civilian plutonium stockpile has continued to increase in 2024. France participates in nearly all INFCIRC initiatives and continues to contribute to the NSF. There is room for improvement in enhancing measures against insider threats and for cybersecurity as well as in enhancing nuclear security culture.

3. Russia Nuclear-Weapon State

Nuclear Disarmament	-7.5 Points	Full Points 109	-6.9%	
	Change compared to the Hiroshima Report 2024 -1.1			

Russia continued its invasion of Ukraine and repeatedly engaged in nuclear intimidation. It also started to deploy nuclear weapons to Belarus. It is estimated to possess around 5,600 nuclear warheads and has been actively modernizing its ICBMs. The development of hypersonic boost-glide weapons, long-range nuclear-powered torpedoes and nuclear-powered cruise missiles is closely monitored. In November, Russia conducted a live-fire test of the new Oreshnik IRBM in Ukraine. Russia continued to suspend the implementation of the New START and declined to allow on-site inspections and data sharing. Nevertheless, it asserted its commitment to complying with the treaty's quantitative limits. It also insists that further progress on nuclear disarmament requires Western countries to abandon their "hostile" policies toward Russia. It announced the revision of its nuclear doctrine and made some changes to its policy of negative security assurances. After its decision to revoke its ratification of the CTBT, it has argued that Russia will not conduct nuclear explosion tests as long as the United States does not conduct it. It is critical of nuclear disarmament verification efforts led by the US and other countries. It voted against all UNGA Resolutions on nuclear disarmament, including that proposed by Japan, and on an FMCT. It has not signed the TPNW and has harshly criticized it.

Nuclear Non-Proliferation	22 Points	Full Points 47	46.8%		
	Change compared to the Hiroshima Report 2024 -3				

Russia has been impeding the implementation of IAEA safeguards by attacking and occupying nuclear facilities in Ukraine. The country repeatedly defended North Korea's nuclear and missile activities at the UNSC. Russia vetoed the extension of the term of the panel of experts of UNSC's North Korea sanction committee. In addition, it was reported that Russia has received missiles and troops from North Korea, which is an obvious violation of the UNSC resolution. Russia acceded to the IAEA Additional Protocol, in which no provision for complementary access visits is stipulated. It considers that the conclusion of an Additional Protocol should be voluntary. Russia supported and participated in the UN conference on a WMD free zone in the Middle East. It submitted a report based on the Guidelines for the Management of Plutonium to the IAEA.

Nuclear Security	6 Points	Full Points 38	15.8%		
	Change compared to the Hiroshima Report 2024 1				

Russia has ratified all nuclear security-related conventions and has established a national implementation system for the A/CPPNM. It has continued to produce civilian HEU. Its stockpile of plutonium for civil uses increased. Russia has never hosted an IPPAS mission. It continues to contribute to the NSF. Russia has continued to attack and occupy nuclear power plants in Ukraine, also it appeared to attack infrastructure, such as power grid, that is critical for nuclear security. There is room for improvement in enhancing measures against insider threats and for cybersecurity.

4. The United Kingdom ■Nuclear-Weapon State

Nuclear Disarmament	22.5 Points	Full Points 109	20.6%			
Nuclear Disarmament	Change compared to the Hiroshima Report 2024 0					

The U.K. maintained its nuclear policies formulated in 2021, which include increasing the limit on its overall nuclear weapons stockpile to no more than 260 and imposing certain restrictions on transparency. The decision to build four Vanguard-class SSBNs remains unchanged. The U.K. opposes the TPNW and has not signed it. Along with France and the U.S., the U.K. has expressed its commitment not to delegate the decision to use nuclear weapons to AI. It has ratified the CTBT and supports the early commencement of FMCT negotiations. Additionally, the U.K. has collaborated with the U.S. and Norway to develop nuclear disarmament verification measures and participates in the IPNDV. It voted in favor of the UNGA resolution on nuclear disarmament proposed by Japan.

Nuclear Non-Proliferation	40 Points	Full Points 47	85.1%		
	Change compared to the Hiroshima Report 2024 -1				

The U.K. acceded to the IAEA Additional Protocol with the provision for complementary access visits. All of its civilian nuclear material is subject to the international safeguards. It has proactively engaged in nuclear non-proliferation, including implementation of export controls. It mentioned the conditions for the supply of nuclear-related equipment and technology in the IAEA Additional Protocol. It continues to engage discussions with the IAEA regarding the implementation of safeguards on nuclear fuel for Australia's nuclear-powered submarines, which is being promoted by Australia, the U.K. and the U.S. It has not submitted a report based on the Guidelines for Management of Plutonium to the IAEA in 2024.

Nuclear Security	23 Points	Full Points 38	60.5%
	Change compared to the Hiroshima Report 2024 0		

The U.K. has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. It hosted an IPPAS mission in 2016 and announced

in 2022 a plan to host a new one. Its civilian plutonium stockpile decreased. Insider threat and cyber security measures have been taken and efforts are the most advanced in the world and among all NWSs. The U.K. is working on enhancing nuclear security culture. It participates in all INFCIRC initiatives and continues to contribute to the NSF.

5. The United States ■Nuclear-Weapon State

Nuclear Disarmament	18.4 Points	Full Points 109	16.9%	
	Change compared to the Hiroshima Report 2024 -0.4			

The U.S. possesses an estimated 5,000 nuclear warheads, making it the second largest NWS after Russia, and continues to reduce this number. In the joint statement of the Japan-U.S. summit, it reaffirmed its commitment to a world without nuclear weapons. Although the U.S. has called for arms control dialogue with Russia and China, it has not yet achieved concrete results. The U.S. opposes the TPNW and has not signed it. Its plans to modernize nuclear forces will continue and the deployment of SLBMs with low-yield nuclear warheads will be maintained. The U.S. stated that it would not adopt policies such as no first use of nuclear weapons or the sole purpose of nuclear weapons. Along with France and the U.K., the U.S. has expressed its commitment not to delegate the decision to use nuclear weapons to AI. Although the U.S. has not ratified the CTBT, it has expressed its intention to work toward the treaty's entry into force. It has announced that it had conducted a sub-critical nuclear testing in May. It remains one of the most transparent NWS on nuclear issues. It has publicly disclosed the number of nuclear warheads in its stockpile and the number of dismantled warheads. It has established and led the IPNDV. It voted in favor of the UNGA resolution on nuclear disarmament proposed by Japan.

Nuclear Non-Proliferation	38 Points	Full Points 47	80.9%
	Change compared to the Hiroshima Report 2024 -1		

Regarding an (interim) Iran nuclear deal, the U.S. joined indirect negotiations with Iran and other countries concerned. However, they could not reach an agreement to reconstruct a deal. It abstained the UNGA Resolution on the Establishment of a WMD-Free Zones in the Middle East, and did not participate in the Conference on the Establishment of a WMD-Free Zones in the Middle East. The U.S. has proactively led the efforts to bolster nuclear non-proliferation, including contributions to the IAEA safeguards systems and implementation of stringent export controls. It acceded to the IAEA Additional Protocol with the provision for complementary access visits. It continues to engage discussions with the IAEA regarding the implementation of safeguards on nuclear fuel for Australia's nuclear-powered submarines, which is being promoted by AUKUS. The U.S. has not submitted a report based on the Guidelines for Management of Plutonium to the IAEA in 2024.

Nuclear Security	23 Points	Full Points 38	60.5%
	Change compared to the Hiroshima Report 2024 3		

The U.S. has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. The U.S. received an IPPAS mission in 2024. It is vigorously supporting other countries' HEU minimization efforts. The U.S. participates in all INFCIRC initiatives and continues to contribute to the NSF. The U.S. is keen to address insider threats and cybersecurity measures. It hosted an international workshop on insider threat mitigation with Belgium in 2024.

(2) Non-Parties to the NPT

6. India Non-Party to the NPT

Nuclear Disarmament	4 Points	Full Points 106	3.8%		
Nuclear Disarmament	Change compared to the Hiroshima Report 2024 0.2				
India is estimated to possess approximately 172 nuclear warheads and continues to incrementally increase its stockpile. It also continues to actively develop various types of nuclear delivery vehicles. India has not signed the TPNW. While India maintains a moratorium on nuclear tests, it refuses to sign the CTBT and abstained from voting on the UNGA Resolution calling for the early entry into force of the treaty. India maintains its NFU policy despite reserving the option for nuclear retaliation in response to a major biological or chemical attack against it.					
Nuclear Non-Proliferation	15 Points	Full Points 43	34.9%		
ivuelear i von i romeration	Change compared to the Hiroshima Report 2024 0				
India acceded to the IAEA Additional Protocol, in which no provision for complementary access visits is stipulated. India's quest for membership in the NSG is supported by some member states, but the group has not yet made a decision. Actual nuclear cooperation with India by the NPT states parties has not necessarily been conducted, except India's import of uranium.					
Nuclear Security	10 Points	Full Points 38	26.3%		
Indelear Security	Change compared to the Hiroshima Report 2024 0				
India has ratified all nuclear security-related conventions except the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. There is room for improvement in national legislation for the A/CPPNM. Its stocks of HEU and separated plutonium for military use have continued to slightly increase in 2024. India has never received an IPPAS mission. There is room for improvement in enhancing measures against insider					

7. Israel Non-Party to the NPT

threats.

<i></i>			
Nuclear Disarmament	-1.5 Points	Full Points 106	-1.4%
	Change compared to the Hiroshima Report 2024 2		

Israel is believed to possess around 90 nuclear warheads but has consistently maintained a policy of "nuclear opacity," neither confirming nor denying the existence of its nuclear arsenal. As a result, there are many uncertainties surrounding its nuclear capabilities and posture. Israel has developed and deployed nuclear-capable IRBMs and SLCMs. Israel has yet to ratify the CTBT. It has not declared a moratorium on the production of fissile material for nuclear weapons and has abstained from voting on the UNGA resolution on an FMCT. It also voted against most UNGA resolutions on nuclear disarmament. Israel has not signed the TPNW.

Nuclear Non-Proliferation	12 Points	Full Points 43	27.9%
	Change compared to the Hiroshima Report 2024 0		

Israel argues that improvement of regional security is imperative for establishing a WMD-Free Zone in the Middle East. It voted against the UNGA resolution "Establishment of a nuclear-weapon-free zone in the region of the Middle East," and rejected to participate in the Conference on the Establishment of a WMD-Free Zone in the Middle East. It has established solid export control systems. Meanwhile, Israel has not acceded to the IAEA Additional Protocol.

Nuclear Security	15 Points	Full Points 38	39.5%		
	Change compared to the Hiroshima Report 2024 0				
Israel has not ratified multiple nuclear security-related conventions, but has established national					

implementation system for the A/CPPNM. Its stockpile of plutonium for military uses has increased. Israel has never received IPPAS missions. It has actively participated in multilateral initiatives. There is room for improvement in disseminating information on nuclear security efforts.

8. Pakistan Non-Party to the NPT

Nuclear Disarmament	-0.5 Points	Full Points 106	-0.5%	
	Change compa	ared to the Hiroshima R	eport 2024 -1.7	

Pakistan is estimated to possess around 170 nuclear warheads and continues to incrementally increase its nuclear arsenal. It continues to develop and to deploy short- and medium-range ballistic missiles. Pakistan has not signed the TPNW. While maintaining a moratorium on nuclear testing, it refuses to sign the CTBT. Pakistan continues to block the commencement of FMCT negotiations at the CD and voted against the UNGA resolution calling for the immediate commencement of FMCT negotiations. It has yet to declare a moratorium on the production of fissile material for nuclear weapons.

Nuclear Non-Proliferation	8 Points	Full Points 43	18.6%
	Change compared to the Hiroshima Report 2024 0		

Pakistan has not yet acceded to the IAEA Additional Protocol. It argues that it has made efforts to enhance its export control systems; however, it is still unclear how robust or successfully implemented such export control systems are in practice. Pakistan has argued that it is qualified to be accepted as an NSG member, but has yet to achieve this status.

Nuclear Security	14 Points	Full Points 38	36.8%
	Change compared to the Hiroshima Report 2024 2		

Pakistan has not signed the ICSANT nor the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste. They established a domestic implementation system for the A/CPPNM. Its military use HEU holdings has increased. Pakistan has never received an IPPAS mission. Pakistan is proceeding with reform to its nuclear security regime and has issued regulatory guidance. The country is actively engaged in human resource development and promotion of nuclear security culture. There is room for improvement in enhancing measures against insider threats and for cybersecurity. Pakistan contributed to the NSF in 2024.

(3) Non-Nuclear-Weapon States

9. Australia Non-Nuclear-Weapon State

	2				
Nuclear Disarmament	22 Points	Full Points 48	45.8%		
Truckar Disarmanent	Change compared to the Hiroshima Report 2024 -1.5				
Australia advocates a "progressive approach" to nuclear disarmament through incremental measures rather than an immediate legal prohibition of nuclear weapons. Australia has not signed the TPNW. Australia has increased its reliance on extended nuclear deterrence. Australia participates in the IPNDV. It has actively engaged in efforts to promote the early entry into force of the CTBT. It is also a member of the Friends of an FMCT. It has proactively worked on nuclear disarmament in cooperation with civil society and is committed to gender mainstreaming.					
Nuclear Non-Proliferation	56 Points	Full Points 61	91.8%		
Tudecar Tudi-Toniciation	Change comp	pared to the Hiroshima	Report 2024 0		
Australia is also a state party to the South Pacific Nuclear-Free Zone Treaty. It acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. The Australia-India Nuclear Cooperation Agreement was adopted in 2015, and Australia exports uranium. Australia, the U.K. and the U.S. decided to work together to introduce nuclear submarines to Australia. It continues consultations with the IAEA regarding how to implement IAEA safeguards for their nuclear fuel. It has implemented export controls appropriately.					
Nuclear Security	27 Points	Full Points 38	71.1%		
Truckar Security	Change comp	ared to the Hiroshima I	Report 2024 -1		
Australia has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. It hosted an IPPAS mission in 2017. Australia has made part of its IPPAS mission report publicly available. It has not made contributions to the NSF recent years. Australia participates in almost all INFCIRC initiatives. It has been ahead in cybersecurity measures. Australia served as the co-president of IAEA ICONS in 2024.					

10. Austria Non-Nuclear-Weapon State

Nuclear Disarmament	34 Points	Full Points 48	70.8%	
	Change comp	pared to the Hiroshima	Report 2024 0	
Austria is a state party to the TPNW and has consistently led the way in advocating for the legal prohibition of nuclear weapons, including serving as a chair country of the 1MSP. It has also played a prominent role in highlighting the humanitarian aspects of nuclear weapons. Austria argues that nuclear weapons undermine common security. It has proactively engaged in cooperation with civil society and gender mainstreaming efforts.				
Nuclear Non-Proliferation	52 Points	Full Points 61	85.2%	
ruclear run rioneration	Change compared to the Hiroshima Report 2024 0			
Anothing has portionered in and implemented the related treation and measures. It areaded to the				

Austria has participated in and implemented the related treaties and measures. It acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. It has implemented export controls appropriately.

11. Belgium ■Non-Nuclear-Weapon State

Nuclear Security	28 Points	Full Points 38	73.7%	
Truckar Security	Change compared to the Hiroshima Report 2024			
Belgium ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. Belgium has hosted an IPPAS mission in 2019. In 2024, Belgium announced that it requested an IPPAS mission for 2027. It hosted the IAEA seminar on IPPAS mission in 2024 Belgium continues to take initiative to strengthen international				
efforts on insider threat, but here is room for improvement in the areas of domestic efforts and cybersecurity measures. Belgium is the most advanced country in efforts to foster nuclear security culture. It contributed to the NSF. Belgium hosted an international workshop on insider threat				
mitigation with the U.S. in 2024				

12. Brazil Non-Nuclear-Weapon State

Nuclear Disarmament	31.5 Points	Full Points 48	65.6%	
Nuclear Disarmanicht	Change comp	pared to the <i>Hiroshima</i> I	Report 2024 2	
While actively taking the initiative toward the adoption of the TPNW and signing the treaty, Brazil has not yet ratified it. It has consistently voted in favor of most UNGA Resolutions on nuclear disarmament. It has ratified the CTBT. Brazil participates in the IPNDV.				
Nuclear Non Proliferation	43 Points	Full Points 61	70.5%	
Nuclear Non-Promeration	Change comp	pared to the Hiroshima	Report 2024 0	
Brazil is a state party to the Latin America Nuclear-Weapon-Free Zone Treaty. While it complies with nuclear non-proliferation obligations, Brazil continues to be reluctant to accept the IAEA Additional Protocol. It considers that the conclusion of the Additional Protocol should be voluntary. Brazil has begun to construct nuclear submarines, and discussions are continuing with the IAEA on safeguards for the nuclear fuel of nuclear submarines. In this regard, Brazil submitted preliminary design information to the IAEA.				
Nuclear Security 22 Points Full Points 38 57.9%				
Nuclear Security	Change comp	pared to the Hiroshima	Report 2024 0	
Brazil ratified the A/CPPNM in 2022 and became a party to all nuclear security-related conventions. They have developed national legislation to implement the A/CPPNM. Brazil established an independent regulatory authority. Brazil has never received an IPPAS mission. Brazil holds cyber defense drills for its nuclear energy sector every year. There is room for improvement in participation in multilateral efforts. There is room for improvement in enhancing measures against insider threats.				

13. Canada ■Non-Nuclear-Weapon State

Nuclear Disarmament	22 Points	Full Points 48	45.8%
	Change compared to the Hiroshima Report 2024 2		

Canada advocates a "progressive approach" to nuclear disarmament through incremental measures rather than an immediate legal prohibition of nuclear weapons. It has not signed the TPNW. Canada is actively committed to the elaboration of the CTBT verification system and to the treaty's early entry into force, and it is working toward the elaboration of an FMCT. Canada has also undertaken active cooperation with civil society and gender mainstreaming. Canada participates in the IPNDV.

Nuclear Non-Proliferation	52 Points Full Points 61 85.2%				
	Change compared to the Hiroshima Report 2024 0				
Canada acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. It					

undertakes proactive efforts for nuclear non-proliferation, including proceeding with the export control reform. Canada exported uranium to India, as part of their civil nuclear cooperation.

Nuclear Security	30 Points	Full Points 38	78.9%
	Change compared to the Hiroshima Report 2024 0		

Canada has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. In addition to strengthening national laws and cybersecurity regulations, it is also actively involved in fostering a nuclear security culture. Canada hosted an IPPAS mission in 2015 and has made part of the IPPAS mission report publicly available. Canada participates in almost all INFCIRC initiatives and is a continuous contributor to the NSF.

14. Egypt ■Non-Nuclear-Weapon State

Nuclear Disarmament	19.5 Points	Full Points 48	40.6%
	Change compared to the Hiroshima Report 2024 0		

Egypt voted in favor of most UNGA Resolutions on nuclear disarmament and has expressed support for issues related to the humanitarian dimensions and legal prohibition of nuclear weapons. It has not yet signed the TPNW. Even though Egypt has shown some support for nuclear disarmament, it cannot be said to be actively pursuing it. It has not ratified the CTBT. It also abstained from voting on the UNGA resolution on an FMCT.

Nuclear Non-Proliferation	37 Points	Full Points 61	60.7%
	Change compared to the Hiroshima Report 2024 0		

Egypt has been active toward establishing a WMD-free zone in the Middle East, including an initiative to convene the UN Conference on a WMD-free zone in the Middle East. Meanwhile, it has yet to conclude the IAEA Additional Protocol. Egypt has made efforts toward, inter alia, putting export control legislation in place. Still, its export controls remain at an insufficient level. While signing, it has not yet ratified the Africa Nuclear-Weapon-Free Zone Treaty.

15. Finland Non-Nuclear-Weapon State

Nuclear Security	32 Points	Full Points 38	84.2%
	Change compared to the Hiroshima Report 2024 -2		

Finland has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. They hosted an IPPAS mission in 2022, and made part of the IPPAS mission report publicly available. Finland has made continuous contributions to the NSF. They are the only country in the world that is constructing a final repository for high-level radioactive waste, which is scheduled to be operational in 2025. Finland is ahead in cybersecurity measures.

16. Germany ■Non-Nuclear-Weapon State

Nuclear Disarmament	19.5 Points	Full Points 48	40.6%
Nuclear Disarmament	Change compared to the Hiroshima Report 2024 0.5		

While Germany has proactively engaged in nuclear disarmament, it has voted against or abstained from voting on UNGA Resolutions related to the humanitarian dimensions and the legal aspects of nuclear weapons. Germany has not signed the TPNW. It advocates a "progressive approach" toward nuclear disarmament through incremental measures rather than an immediate legal prohibition of nuclear weapons. Germany hosts U.S. non-strategic nuclear weapons as part of NATO's nuclear sharing policy and has increased its reliance on extended nuclear deterrence. It has ratified the CTBT and calls for the immediate commencement of FMCT negotiations. It participates in the IPNDV and is actively engaged in cooperation with civil society on nuclear

disarmament efforts.			
Nuclear Non-Proliferation	56 Points	Full Points 61	91.8%
	Change compared to the Hiroshima Report 2024 0		

Germany acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. It has engaged in non-proliferation, including the establishment of solid export control systems. Germany submitted a report based on the Guidelines for the Management of Plutonium to the IAEA, including its holding of civil HEU in addition to that of civil plutonium.

Nuclear Security	29 Points	Full Points 38	76.3%
	Change compared to the Hiroshima Report 2024 1		

Germany has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. They have hosted an IPPAS mission in 2017. It participates in a number of INFCIRC initiatives and continues to contribute to the NSF.

17. Indonesia ■Non-Nuclear-Weapon State

Nuclear Disarmament	33.5 Points	Full Points 48	69.8 %	
Tuelear Disarmament	Change compa	Change compared to the Hiroshima Report 2024 4.5		
Indonesia has actively advocated disarmament fora. It consistently demonstrating support for the iss as well as their legal prohibition. I in the IPNDV.	for the promotion of voted in favor of UN ues related to the hum Indonesia has ratified	f nuclear disarmamer GA Resolutions on n nanitarian dimensions the TPNW and the C	it in various nuclear uclear disarmament, of nuclear weapons TBT. It participates	

Nuclear Non-Proliferation	48 Points	Full Points 61	78.7%
	Change compared to the Hiroshima Report 2024 0		

Indonesia is a state party to the Southeast Asia Nuclear-Weapon-Free Zone Treaty. It has concluded the IAEA Additional Protocol, and applied the integrated safeguards. On export controls, however, Indonesia has yet to prepare a list of dual-use items and technologies, or to implement catch-all control.

18. Iran ■Non-Nuclear-Weapon State

Nuclear Disarmament	15.5 Points	Full Points 48	32.3%
i vuelear Disarmament	Change compared to the Hiroshima	Leport 2024 1.5	

Iran has consistently voted in favor of most UNGA Resolutions on nuclear disarmament, demonstrating support for the issues related to the humanitarian dimensions of nuclear weapons as well as their legal prohibition. However, it has not actively promoted nuclear disarmament. Iran has neither ratified the CTBT nor signed the TPNW. It voted against the UNGA resolutions on nuclear disarmament proposed by Japan and on an FMCT. It has been strengthening its relations with Russia amidst the latter's ongoing invasion of Ukraine.

Nuclear Non Proliferation	25 Points	Full Points 61	41%	
Nuclear Non-Promeration	Change compared to the Hiroshima Report 2024 0			

Although indirect negotiations by the countries concerned to restore an (interim) Iran nuclear deal were held intermittently, no agreement was reached. As a countermeasure to the U.S. withdrawal from the JCPOA and the enhancement of sanctions on Iran, Tehran has steadily expanded the areas from which it has withdrawn from its obligations under the JCPOA; such as the upper limits of, inter alia, its stockpile of enriched uranium, level of enrichment (including 20% and 60% HEU), and the number of centrifuges. After the adoption of the IAEA Board of Governor resolution in November, Iran has initiated expanding production of 60% HEU. In addition, it also suspended verification and monitoring measures under the JCPOA, including the

provisional application of the Additional Protocol to the IAEA Safeguards Agreement. The IAEA could not resolve the issues regarding the accuracy and completeness of declarations for four sites related to the alleged Iran's past clandestine nuclear program. In addition, newly unaccounted for nuclear material has been confirmed. Iran continued to deny entry to some IAEA inspectors.

Nuclear Security	5 Points	Full Points 38	13.2%
i vuelear Security	Change comp	pared to the Hiroshima	Report 2024 1

Iran is not a party to several nuclear security-related conventions, and there is room for improvement. Although Iran was supposed to complete domestic procedures for ratifying the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste, it appears that they have not done so in 2024. Iran continued to produce HEU for civilian use and increased its holdings. Iran received an IPPAS mission in 2004. There is room for improvement in disseminating information on nuclear security efforts. Iran participated in the IAEA workshop on the establishment and operation of the NSSC. It opposed the adoption of a ministerial declaration at the ICONS in 2024.

19. Japan ■Non-Nuclear-Weapon State

Nuclear Disarmament	26 Points	Full Points 48	54.2%		
Nuclear Disarmament	Change compa	ared to the Hiroshima R	eport 2024 -1.5		
Japan advocates a "progressive approach" toward nuclear disarmament through incremental measures rather than an immediate legal ban on nuclear weapons. It has not signed the TPNW. It has increased its reliance on extended nuclear deterrence. Japan has proactively engaged in nuclear disarmament, including promoting the entry into force of the CTBT, participation in the FMCT Friends group, improving transparency regarding nuclear weapons, and undertaking disarmament and non-proliferation education as well as cooperation with civil society. In September, Japan hosted the high-level launch meeting of the Friends of an FMCT. The first phase of the "Youth Leader Fund for a World Without Nuclear Weapons," funded by Japan, was launched. Japan participates in the IPNDV.					
Nuclear Non-Proliferation	53 Points	Full Points 61	86.9%		
Change compared to the <i>Hiroshima</i> Report 2024 0					
Japan has acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. It has proactively engaged in nuclear non-proliferation, including the establishment of solid export control systems and conducting outreach activities. It submitted a report based on the Guidelines for the Management of Plutonium to the IAEA.					
Na ala a Sa avaita	32 Points	Full Points 38	84.2%		
Nuclear Security	Change compared to the <i>Hiroshima</i> Report 2024 1				
Japan ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. Japan is continuously working on minimizing HEU and has made					

system for the A/CPPNM. Japan is continuously working on minimizing HEU and has made progress in 2024 as well. It has accepted an IPPAS mission in 2024. Japan has made part of its IPPAS mission reports publicly available. It participates in a number of INFCIRC initiatives and continues to contribute to the NSF.

20. Kazakhstan ■Non-Nuclear-Weapon State

Nuclear Disarmament	38 Points	Full Points 48	79.2%	
i vuelear Disarmament	Change compared to the Hiroshima Report 2024 2			
Kazakhstan has actively advocated for the entry into force of the CTBT and contributed to the				
development of its verification sy	stem. It consistently	voted in favor of UN	GA Resolutions on	
nuclear disarmament, and has	expressed approval	of issues regarding	g the humanitarian	

dimensions and legal prohibition of nuclear weapons. It is a state party to the TPNW and it is actively engaged in issues related to victim assistance and environmental remediation. It has led joint statements at the NPT PrepCom as well as UNGA resolutions. Kazakhstan participates in the IPNDV.

Nuclear Non-Proliferation	49 Points	Full Points 61	80.3%
Nuclear Non-1 Tomeration	Change compared to the Hiroshima Report 2024 0		

Kazakhstan is a state party to the Central Asia Nuclear-Weapon-Free Zone Treaty. It has acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. The IAEA LEU Fuel Bank, established in Kazakhstan, became operational in 2017, and received the LEU shipment.

Nuclear Security	27 Points Full Points 38	71.1%	
Indelear Security	Change comp	pared to the Hiroshima	Report 2024 1

Kazakhstan has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. It is focusing on human resource development in cybersecurity and is vigorously working on HEU minimization. The last IPPAS mission was accepted in 2012. It has participated in almost all INFCIRC initiatives. Kazakhstan served as the co-president of ICONS in 2024.

21. South Korea Non-Nuclear-Weapon State

Nuclear Disarmament	20.5 Points	Full Points 48	42.7%
	Change compared to the Hiroshima Report 2024 0.5		

South Korea advocates a "progressive approach" toward nuclear disarmament through incremental measures rather than an immediate legal ban on nuclear weapons. It has not signed the TPNW. It has increased its reliance on extended nuclear deterrence and has announced the completion of guidelines through the US-South Korea NCG to address potential North Korean nuclear attacks. It has ratified the CTBT and supports the immediate commencement of FMCT negotiations. South Korea has engaged in promoting the CTBT's entry into force and is actively developing its verification system. It participates in the IPNDV. It also actively advocates nuclear disarmament and non-proliferation education.

Change compared to the <i>Hiroshima</i> Report 2024 0	Nuclear Non Proliferation	51 Points	Full Points 61	83.6%
	indelear mon-riomeration	Change comp	bared to the Hiroshima	Report 2024 0

South Korea acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. An appropriate export controls has also been implemented. With North Korea's rapid development of nuclear weapons and missiles, there were again comments from South Korean government officials implying an interest in acquiring nuclear weapons.

Nuclear Security	31 Points	Full Points 38	81.6%
Indelear Security	Change comp	pared to the Hiroshima H	Report 2024 -1

South Korea has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. It hosted an IPPAS mission in 2014. South Korea has participated in almost all INFCIRC initiatives and continues to contribute to the NSF.

22. Mexico Non-Nuclear-Weapon State

Nuclear Disarmament	37 Points	Full Points 48	77.1%
	Change compared to the Hiroshima Report 2024 1		

Mexico has played a leading role in promoting the discussion on the humanitarian dimensions of nuclear weapons and in the adoption and development of the TPNW. It is a state party to the TPNW and it participates in the IPNDV. It has also engaged actively in gender mainstreaming efforts.

Nuclear Non-Proliferation	50 Points	Full Points 61	82%		
	Change compared to the Hiroshima Report 2024 0				
Mexico is also a state party to the Latin America Nuclear-Weapon-Free Zone Treaty. Mexico acceded to the IAEA Additional Protocol, but a broader conclusion has not yet been drawn.					
Nuclear Security	26 Points	Full Points 38	68.4%		
Indelear Security	Change compared to the Hiroshima Report 2024 -1				
Marico has ratified all nuclear security related conventions and established a national					

Mexico has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. Mexico hosted an IPPAS follow-up mission in 2006 and has received support from the IAEA INSSP mission in 2024. It has participated in many INFCIRC initiatives.

23. The Netherlands Non-Nuclear-Weapon State

Nuclear Disarmament	19 Points	Full Points 48	39.6%		
Nuclear Disarmament	Change compa	ared to the <i>Hiroshima</i> R	Leport 2024 1.5		
The Netherlands advocates a "progressive approach" toward nuclear disarmament through incremental measures rather than an immediate legal ban on nuclear weapons. It has not signed the TPNW. It has ratified the CTBT and supports the immediate commencement of FMCT negotiations. It hosts U.S. non-strategic nuclear weapons as part of NATO's nuclear sharing policy. The Netherlands participates in the IPNDV.					
Nuclear Non Proliferation	55 Points	Full Points 61	90.2%		
Tructear Tron-Tronteration	Change comp	Change compared to the Hiroshima Report 2024 0			
The Netherlands acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. It has actively engaged in non-proliferation activity, including the establishment of solid export control systems.					

Nuclear Security	32 Points	Full Points 38	84.2%
Indelear Security	Change comp	ared to the Hiroshima l	Report 2024 -1

The Netherlands has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. It has hosted five IPPAS missions in total to date, and has made part of the IPPAS mission report publicly available. The Netherlands participates in many INFCIRC initiatives and continues to contribute to the NSF.

24. New Zealand ■Non-Nuclear-Weapon State

Nuclear Disarmament	37.5 Points	Full Points 48	78.1%
Nuclear Disarmament	Change comp	pared to the Hiroshima	Report 2024 2

New Zealand was actively involved in the development of the TPNW, which it has ratified. It has played a leading role in promoting the discussions on the humanitarian dimensions of nuclear weapons. It has also proactively advocated nuclear disarmament in various fora, including the UN General Assembly. It co-authored the UNGA resolution to establish a scientific panel on the effects of nuclear war. It has actively contributed to the development of the CTBT's verification system and called for the treaty's entry into force. It is one of the members of the "De-alerting Group" which advocates the reduction of alert levels.

Nuclear Non-Proliferation	57 Points	Full Points 61	93.4%	
	Change compared to the Hiroshima Report 2024 0			

New Zealand is a state party to the South Pacific Nuclear-Free Zone Treaty. It has acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. An appropriate export control system has also been put in place.

25. Norway ■Non-Nuclear-Weapon State

	_				
Nuclear Disarmament	20 Points	Full Points 48	41.7%		
Truckar Disarmanient	Change compa	red to the Hiroshima R	eport 2024 -0.5		
Norway advocates a "progressive approach" toward nuclear disarmament through incremental measures rather than an immediate legal ban on nuclear weapons. It has increased its reliance on extended nuclear deterrence. It has not signed the TPNW. It has also actively engaged in gender mainstreaming efforts. It has ratified the CTBT and supports the immediate commencement of FMCT negotiations. Norway participates in the IPNDV.					
Nuclear Non-Proliferation	54 Points	Full Points 61	88.5%		
Nuclear Non-Proliferation	Change compared to the Hiroshima Report 2024 0				
Norway acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. It has engaged in non-proliferation, including the establishment of the solid export control systems.					
Nuclear Security	27 Points	Full Points 38	71.1%		
Indelear Security	Change compared to the Hiroshima Report 2024 -4				
Norway has ratified all nuclear security-related conventions and established a domestic implementation system for the A/CPPNM. They continue to work with the U.S. to minimize the use of HEU. Norway hosted an IPPAS mission in 2015, participates in almost all INFCIRC initiatives.					

26. Poland ■Non-Nuclear-Weapon State

Nuclear Disarmament	15 Points	Full Points 48	31.3%		
	Change compa	ared to the <i>Hiroshima</i> R	Report 2024 0.5		
Poland maintains a cautious stance on the legal ban of nuclear weapons. It has not signed the TPNW. Along with the other U.S. allies, it advocates a "progressive approach" toward nuclear disarmament through incremental measures rather than an immediate legal ban on nuclear weapons. It has increased its reliance on extended nuclear deterrence and has expressed its interest in participating in nuclear sharing. It has ratified the CTBT. Poland participates in the IPNDV.					
Nuclear Non-Proliferation	53 Points	Full Points 61	86.9%		
	Change compared to the <i>Hiroshima</i> Report 2024 0				
Poland acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. It					

has engaged in non-proliferation, including the establishment of solid export control systems.

27. Saudi Arabia ■Non-Nuclear-Weapon State

Nuclear Disarmament	15.5 Points	Full Points 48	32.3%		
Nuclear Disarmanient	Change compa	ared to the Hiroshima R	Report 2024 2.5		
Saudi Arabia has consistently voted in favor of most UNGA Resolutions on nuclear disarmament, demonstrating support for the issues related to the humanitarian dimensions of nuclear weapons as well as their legal prohibition. However, it hardly promotes nuclear disarmament and has not signed the TPNW or the CTBT. Saudi Arabia abstained from voting on UNGA resolutions related to the TPNW, the CTBT and an FMCT.					
Nuclear Non-Proliferation	33 Points	Full Points 61	54.1%		
rucical run rinneration	Change compared to the Hiroshima Report 2024 0				
Saudi Arabia stated that its first research reactor is nearing completion and that it has decided to					

Saudi Arabia stated that its first research reactor is nearing completion and that it has decided to abandon the SQP and fully implement the IAEA Comprehensive Safeguards Agreement. It has not signed the IAEA Additional Protocol. Nor it establish a sufficient export control system. Saudi Arabia opposes renouncing a right to conduct enrichment and reprocessing activities in

negotiations on a Saudi-U.S. civil nuclear cooperation agreement.

28. South Africa Non-Nuclear-Weapon State

Nuclear Disarmament	32.5 Points	Full Points 48	67.7%		
i vuelear Disarmament	Change comp	pared to the Hiroshima	Report 2024 3		
South Africa has played a leading role in promoting the issues related to the humanitarian dimensions of nuclear weapons as well as the TPNW to which it is a state party. However, it has					
taken a cautious stance regarding the condemnation of Russia' nuclear intimidations. It has					
ratified the CTBT. South Africa h	as expressed increasir	or Russia nuclear r	risis surrounding the		
NPT and its review process, callin	ng for greater efforts t	oward nuclear disarm	nament.		
Nuclear Non Proliferation 54 Points Full Points 61 88.5%					
Tudecar Tudi-Tomeration	Change comp	pared to the Hiroshima	Report 2024 0		
South Africa is also a state party	to the Africa Nuclear	-Weapon-Free Zone	Treaty. It acceded to		
the IAEA Additional Protocol, a	nd has applied the in	tegrated safeguards. I	It considers that the		
conclusion of an Additional Prot	ocol should be volunt	ary.			
Nuclear Security	20 Points	Full Points 38	52.6%		
Tructear Security	Change comp	pared to the Hiroshima	Report 2024 2		
South Africa ratified the A/CPP	NM in 2024, and wit	h this, it has ratified	all nuclear security-		
related conventions. South Africa	has never used IPPA	S missions. It possess	es civilian HEU.		
29. Sweden INon-INUcle	20 Delate	E-11 D-1-1-1-	/1 7 0/		
Nuclear Disarmament	20 Points	Full Points 48	41.7%		
Nuclear Disarmament	20 Points Change comp	Full Points 48 ared to the <i>Hiroshima</i> I	41.7% Report 2024 -3		
29. Sweden INON-INUCLE Nuclear Disarmament Sweden proposed the "Stockholm Sweden armes that it cannot sign	20 Points Change comp Initiative" and has ad the TPNW in its pres	Full Points 48 ared to the <i>Hiroshima</i> I vocated for the reduc	41.7% Report 2024 -3 tion of nuclear risks.		
29. Sweden ■INOn-INUCLE Nuclear Disarmament Sweden proposed the "Stockholm Sweden argues that it cannot sign has therefore come to rely on ex	20 Points Change comp Initiative" and has ad the TPNW in its pres	Full Points 48 ared to the <i>Hiroshima</i> I vocated for the reduc sent form. Sweden ha	41.7% <i>Report 2024 -3</i> tion of nuclear risks. s joined NATO and yely working on the		
29. Sweden INON-INUCLE Nuclear Disarmament Sweden proposed the "Stockholm Sweden argues that it cannot sign has therefore come to rely on ex promotion of the CTBT's entry ir	20 Points Change comp Initiative" and has ad the TPNW in its pres- tended nuclear determ to force and the devel	Full Points 48 ared to the <i>Hiroshima</i> I vocated for the reduc sent form. Sweden ha ence. It has been acti- opment of its verifica	41.7% Report 2024 -3 tion of nuclear risks. s joined NATO and vely working on the tion system. Sweden		
29. Sweden INON-INUCLE Nuclear Disarmament Sweden proposed the "Stockholm Sweden argues that it cannot sign has therefore come to rely on ex promotion of the CTBT's entry in participates in the IPNDV. It has	20 Points Change comp Initiative" and has ad the TPNW in its pres tended nuclear deterr to force and the devel also proactively engag	Full Points 48 ared to the <i>Hiroshima</i> I vocated for the reduc sent form. Sweden ha ence. It has been acti- opment of its verifica ed in cooperation with	41.7% Report 2024 -3 tion of nuclear risks. s joined NATO and vely working on the tion system. Sweden h civil society as well		
29. Sweden INON-INUCLE Nuclear Disarmament Sweden proposed the "Stockholm Sweden argues that it cannot sign has therefore come to rely on ex promotion of the CTBT's entry in participates in the IPNDV. It has as gender mainstreaming.	20 Points Change comp Initiative" and has ad the TPNW in its pres tended nuclear deterr to force and the devel also proactively engag	Full Points 48 ared to the <i>Hiroshima</i> I vocated for the reduc sent form. Sweden ha ence. It has been actir opment of its verifica ed in cooperation with	41.7% <i>Report 2024 -3</i> tion of nuclear risks. s joined NATO and vely working on the tion system. Sweden h civil society as well		
29. Sweden ■INOn-INUCLE Nuclear Disarmament Sweden proposed the "Stockholm Sweden argues that it cannot sign has therefore come to rely on ex promotion of the CTBT's entry in participates in the IPNDV. It has a as gender mainstreaming.	20 Points Change comp a Initiative" and has ad the TPNW in its pres- tended nuclear determ to force and the devel also proactively engag 54 Points	Full Points 48 ared to the <i>Hiroshima</i> I vocated for the reduc sent form. Sweden ha ence. It has been acti opment of its verifica ed in cooperation with Full Points 61	41.7% Report 2024 -3 tion of nuclear risks. s joined NATO and vely working on the tion system. Sweden h civil society as well 88.5%		
29. Sweden INON-INUCLE Nuclear Disarmament Sweden proposed the "Stockholm Sweden argues that it cannot sign has therefore come to rely on ex promotion of the CTBT's entry in participates in the IPNDV. It has a as gender mainstreaming. Nuclear Non-Proliferation	20 Points Change comp Initiative" and has ad the TPNW in its pres tended nuclear deterrent to force and the devel also proactively engag 54 Points Change comp	Full Points 48 ared to the <i>Hiroshima</i> I vocated for the reduc sent form. Sweden ha ence. It has been activ opment of its verifica ed in cooperation with Full Points 61 pared to the <i>Hiroshima</i>	41.7% Report 2024 -3 tion of nuclear risks. s joined NATO and vely working on the tion system. Sweden h civil society as well 88.5% Report 2024 0		
29. Sweden ■INOn-INUCLE Nuclear Disarmament Sweden proposed the "Stockholm Sweden argues that it cannot sign has therefore come to rely on ex promotion of the CTBT's entry in participates in the IPNDV. It has a as gender mainstreaming. Nuclear Non-Proliferation Sweden acceded to the IAEA Add	20 Points Change comp Initiative" and has ad the TPNW in its pres- tended nuclear determination force and the devel also proactively engag 54 Points Change comp Iditional Protocol, and	Full Points 48 ared to the <i>Hiroshima</i> I vocated for the reduc sent form. Sweden ha ence. It has been actir opment of its verifica ed in cooperation with Full Points 61 pared to the <i>Hiroshima</i> I d has applied the integ	41.7% Report 2024 -3 tion of nuclear risks. s joined NATO and vely working on the tion system. Sweden h civil society as well 88.5% Report 2024 0 grated safeguards. It		
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30. Switzerland ■Non-Nuclear-Weapon State

	<u>+</u>			
Nuclear Disarmament	28 Points	Full Points 48	58.3%	
	Change compared to the Hiroshima Report 2024 -0.5			
Switzerland argues that it cannot sign the TPNW in its current form. It has ratified the CTBT and advocates the immediate commencement of FMCT negotiations. Switzerland participates in the IPNDV and is actively engaged in cooperation with civil society. It has enacted domestic laws to limit investments in nuclear weapons.				
Nuclear Non-Proliferation	53 Points	Full Points 61	86.9%	
ivuelear ivon-i ionteration	Change comp	pared to the Hiroshima	Report 2024 0	
Switzerland acceded to the IAEA Additional Protocol, and has applied the integrated safeguards. It has engaged in non-proliferation, including the establishment of solid export control systems. It submitted a report to the IAEA in accordance with the Guidelines for the Management of Plutonium.				
Nuclear Security	31 Points	Full Points 38	81.6%	
Indelear Security	Change compared to the Hiroshima Report 2024 -1			
Switzerland has ratified all nuclear security-related conventions and established a national implementation system for the A/CPPNM. It received an IPPAS follow-up mission in 2023 and made part of their IPPAS mission reports available to the public Switzerland has established a				

made part of their IPPAS mission reports available to the public. Switzerland has established a national cyber security policy. It has implemented cybersecurity measures, including the development of cybersecurity regulatory guidelines. Switzerland continues to contribute to the NSF.

31. Syria ■Non-Nuclear-Weapon State

Nuclear Disarmament	11 Points	Full Points 48	22.9%		
	Change comp	ared to the Hiroshima I	Report 2024 -1		
Syria has consistently voted in favor of most UNGA Resolutions on nuclear disarmament,					
including those addressing the humanitarian dimensions and the legal prohibition of nuclear					
weapons. However, it is not actively engaged in the promotion of nuclear disarmament. It has					
opposed the UNGA resolution on nuclear disarmament proposed by Japan. Syria has not signed					
the TPNW or the CTBT, and abst	ained from voting on	the UNGA resolution	n calling for the early		
entry into force of the CTBT and	l the resolution on the	e FMCT.			

Nuclear Non-Proliferation	21 Points	Full Points 61	34.4%
	Change compared to the Hiroshima Report 2024 1		

Syria has yet to address and resolve the allegation of constructing a clandestine nuclear power plant, despite repeated requests by the IAEA. Syria has not concluded the IAEA Additional Protocol, and has yet to take appropriate measures on export controls.

32. Turkey Non-Nuclear-Weapon State

	<u> </u>		
Nuclear Disarmament	12.5 Points	Full Points 48	26%
Nuclear Disarmanient	Change compa	ared to the Hiroshima R	Leport 2024 0.5
H 1 1 <i>u</i> 1			

Turkey advocates a "progressive approach" toward nuclear disarmament through incremental measures rather than an immediate legal ban on nuclear weapons. It relies on U.S. extended nuclear deterrence and hosts U.S. nuclear weapons on its territory. It has not signed the TPNW. Turkey participates in the IPNDV.

Nuclear Non-Proliferation	53 Points	Full Points 61	86.9%
	Change compared to the Hiroshima Report 2024 0		

Turkey acceded to the IAEA Additional Protocol, and a broader conclusion was drawn. However, it has not applied the integrated safeguards. It has engaged in non-proliferation, including the establishment of solid export control systems.

Nuclear Security	27 Points	Full Points 38	71.1%
Indelear Security	Change compared to the Hiroshima Report 2024 1		

Turkey ratified all nuclear security-related conventions. It established a national implementation system for the A/CPPNM. Turkey accepted an IPPAS mission in 2021 to strengthen its national legal system and apply the recommended measures of INFCIRC/225/Rev.5.

33. The UAE ■Non-Nuclear-Weapon State

	<u> </u>		
Nuclear Security	25 Points	Full Points 38	65.8%
Truckar Security	Change compared to the Hiroshima Report 2024 3		
The UAE is a country newly introduced nuclear power generation, having started operation in 2021. It has ratified all nuclear security-related conventions and established a national			
implementation system for the A/CPPNM. The UAE hosted an IPPAS mission in 2016. New			
nuclear security regulation was approved in 2024.			

(4) Other

34. North Korea **O**ther

Nuclear Disarmament	-13.7 Points	Full Points 106	-12.9%
Nuclear Disarmament	Change compared to the Hiroshima Report 2024 -1.7		
North Korea has repeatedly conducted missile launch tests and drills, including with ICBMs. The number of its nuclear warheads is likely to keep increasing. North Korea stated that the role of its nuclear arsenal is to deter war and take the initiative in conflict. It has clearly indicated the possibility of using nuclear weapons first. It is strengthening its nuclear capabilities from both strategic and tactical perspectives. It opposed the UNGA resolution on nuclear disarmament proposed by Japan. It is likely to continue the production of fissile material for nuclear weapons. North Korea abstained from voting on the UNGA resolution on an FMCT. It has not signed the TPNW or the CTBT. It also opposed the UNGA Resolution calling for the early entry into force of the CTBT. It has withdrawn its moratorium on nuclear testing.			
Nuclear Non Proliferation	0 Points	Full Points 61	0.0%
Nuclear Non-Promeration	Change comp	pared to the Hiroshima	Report 2024 0
North Korea clearly stated that it had no intention to renounce its nuclear forces. Nor has it responded to talks on North Korea's denuclearization. North Korea, which declared to withdraw from the NPT in 2003, ignores or reneges on most of the nuclear-related treaties, agreements, obligations and norms. North Korea continues to engage in illicit trafficking and procurement of nuclear-related items and others through, inter alia, ship-to-ship transfers and cyber activities. There are concerns that North Korea, which provided missiles and troop, may receive military and rocket technologies from Russia, in return. It concluded the Comprehensive Strategic Partnership Treaty with Russia, including scientific cooperation in the nuclear field.			
Nuclear Security	-1 Points	Full Points 38	-2.6%
	Change comp	pared to the Hiroshima	Report 2024 0
North Korea continues to have not ratified any conventions related to nuclear security. There continues to be no dissemination of information on nuclear security efforts, and progress in this area remains unclear.			



Chronology (January-December 2024)

Jan	U.S. and Chinese deputy-level defense officials met for the Defense Policy Coordination Talks (DPCT) (Virginia) (8~9th)
	U.S. Department of State released the report to Congress on the implementation of the New START (Strategic Arms Reduction Treaty) (31st)
Feb	The five nuclear-weapon states (NWS) held a working group meeting (Riyadh) (29th)
Mar	Australia and the U.K. agreed to cooperate on the SSN-AUKUS programme at the Ministerial Consultations (2+2) (22nd)
	Russia vetoed to renew the mandate of an expert panel monitoring U.N. sanctions on North Korea (28th)
Apr	G7 Non-Proliferation Directors Group released a statement (19th)
May	The International Conference on Nuclear Security (ICONS) was organized by the IAEA (Vienna) (20~24th)
Jun	The US-led International Partnership for Nuclear Disarmament Verification (IPNDV) celebrated the progress that it has made across 10 years (Geneva) (26~27th)
Jul	China announced it has halted nuclear arms control talks with the U.S. (17th)
	The Second Preparatory Committee for the 2026 Nuclear Non-Proliferation Treaty (NPT) Review Conference (Vienna) (22~Aug 2nd)
Aug	Hiroshima Peace Memorial Ceremony (6th)
	Nagasaki Peace Memorial Ceremony (9th)
	The Japan Visit Programme of the Youth Leader Fund for a World without Nuclear Weapons run by the UNODA (26~30th)
Sep	The 68th General Conference of the International Atomic Energy Agency (IAEA) (Vienna) (16~20th)
	The High-Level Meeting to Launch the Friends of a Fissile Material Cut-off Treaty (FMCT) (New York) (23rd)
	The 11th Ministerial Meeting of the Friends of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) (New York) (24th)
	China conducted a test launch of an ICBM over the Pacific Ocean (25th)
	Japan participated in Proliferation Security Initiative (PSI) Exercise Pacific Protector 24, hosted by Australia (24~27th)
Oct	Nihon Hidankyo won the Nobel Peace Prize (11th)
Nov	Russia amended its nuclear doctrine (19th)
	Russia fired a new IRBM named Oreshnik against Ukraine (21st)
Dec	The five nuclear-weapons states (NWS) held an expert-level meeting (Dubai) (4th)
	The Treaty on Comprehensive Strategic Partnership between North Korea and Russia came into force (5th)

Abbreviation

ABACC	Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials
A/CPPNM	Amendment to the Convention on the Physical Protection of Nuclear Material
AEOI	Atomic Energy Organization of Iran
AG	Australia Group
AI	Artificial Intelligence
ALBM	Air-Launched Ballistic Missile
ALCM	Air-Launched Cruise Missile
АР	Additional Protocol
ASEAN	Association of Southeast Asian Nations
ASMP-A	Air-to-Surface Medium-Range Cruise Missile
ATACMS	Army Tactical Missile System
AUKUS	The Trilateral Security Partnership Between Australia, the U.K. and the U.S.
AWE	Atomic Weapons Establishment
BCC	Bilateral Consultative Commission
CAR	Conflict Armament Research
CBRN	Chemical, Biological, Radiological, and Nuclear
CD	Conference on Disarmament
CEND	Creating an Environment for Nuclear Disarmament
СМХ	Collaborative Materials Exercise
CNS	Convention on Nuclear Safety
CNSC	Canadian Nuclear Safety Commission
CPPNM	Convention on the Physical Protection of Nuclear Material
CRP	Coordinated Research Projects
CSA	Comprehensive Safeguards Agreement
СТВТ	Comprehensive Nuclear-Test-Ban Treaty
СТВТО	CTBT Organization
DBT	Design Basis Threat
DIV	Design Information Verification
DPCT	U.SPRC Defense Policy Coordination Talks
EC	European Commission
EDD	Extended Deterrence Dialogue
EDF	Électricité de France
EDPC	Extended Deterrence Policy Committee
ELWR	Experimental Light Water Reactor
ETTG	Evidence and Testimony Task Group
EU	European Union
EURATOM	European Atomic Energy Community
FANR	Federal Authority for Nuclear Regulation
FEP	Fuel Enrichment Plant
FFEP	Fordow Fuel Enrichment Plant

FMCT	Fissile Material Cut-Off Treaty
FOBS	Fractional Orbital Bombardment System
FPU	First Production Unit
GAO	Government Accountability Office
GBSD	Ground-Based Strategic Deterrent
GICNT	Global Initiative to Combat Nuclear Terrorism
GLCM	Ground-Launched Cruise Missile
GTRI	Global Threat Reduction Initiative
G7GP	Group of Seven Global Partnership
HALEU	High-Assay Low-Enriched Uranium
HEU	Highly Enriched Uranium
HWPP	Heavy Water Production Plant
IAEA	International Atomic Energy Agency
ICAN	International Campaign to Abolish Nuclear Weapons
ICBM	Intercontinental Ballistic Missile
ICJ	International Court of Justice
ICONS	International Conference on Nuclear Security
ICSANT	International Convention for the Suppression of Acts of Nuclear Terrorism
IDC	International Data Centre
IMO	International Maritime Organization
IMS	International Monitoring System
INF	Intermediate-Range Nuclear Forces
INSEN	International Nuclear Security Education Network
INSServ	International Nuclear Security Advisory Service
INSSP	Integrated Nuclear Security Support Plan, or Integrated Nuclear Security Sustainability Plan
INTERPOL	International Criminal Police Organization
IPEN	Instituto de Pesquisas Energéticas e Nucleares
IPNDV	International Partnership for Nuclear Disarmament Verification
IPPAS	International Physical Protection Advisory Service
IRBM	Intermediate-Range Ballistic Missile
IRGC	Islamic Revolutionary Guard Corps
ISCN	Integrated Support Center for Nuclear Nonproliferation and Nuclear Security
ISAMZ	IAEA Support and Assistance Mission to Zaporizhzhia
ISAMRAD	The IAEA Support and Assistance Mission on the Safety and Security of Radioactive Sources in Ukraine
ITDB	Incident and Trafficking Database
ITWG	Nuclear Forensics International Technical Working Group
JAEA	Japan Atomic Energy Agency
JAEC	Japan Atomic Energy Commission
JCPOA	Joint Comprehensive Plan of Action
JHL	Jaber Ibn Hayan Multipurpose Laboratory
KCNA	Korean Central News Agency
KHRR	Khondab Heavy Water Research Reactor

KKNPS	Kashiwazaki-Kariwa Nuclear Power Station
KUCA	Kyoto University Critical Assembly
LEU	Low-Enriched Uranium
LOW	Launch on Warning
LRSO	Long Range Stand-Off Weapon
MBA	Material Balance Area
MFFF	Mixed Oxide Fuel Fabrication Facility
MIRV	Multiple Independently-Targetable Reentry Vehicle
ММСА	Military Maritime Consultative Agreement
MNSR	Miniature Neutron Source Reactor
MOX	Mixed Oxide
MPE	Major Public Events
MRBM	Medium-Range Ballistic Missile
MSMT	Multilateral Sanctions Monitoring Team
MTCR	Missile Technology Control Regime
NAC	New Agenda Coalition
NAM	Non-Aligned Movement
NATO	North Atlantic Treaty Organization
NCG	Nuclear Consultative Group
NDV	Nuclear Disarmament Verification
NFU	No First Use
NGO	Non-Governmental Organization
NNSA	National Nuclear Security Administration
NPDG	Non-Proliferation Directors Group
NPDI	Non-Proliferation and Disarmament Initiative
NPG	Nuclear Planning Group
NPR	Nuclear Posture Review
NPT	Nuclear Non-Proliferation Treaty
NRC	Nuclear Regulatory Commission
NRSWG	Nuclear and Radiological Security Working Group
NSC	National Security Council
NSCG	Nuclear Security Contact Group
NSF	Nuclear Security Fund
NSG	Nuclear Suppliers Group
NSSC	Nuclear Security Training and Support Centres
NSSG	Nuclear Safety and Security Group
NSTDC	Nuclear Security Training and Demonstration Center
NTI	Nuclear Threat Initiative
NuDiVe	The Nuclear Disarmament Verification
ODNI	Office of the Director of National Intelligence
OECD	The Organization for Economic Co-operation and Development
ONR	Office for Nuclear Regulation
OPANAL	Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean

PCENS	Pakistan's Centre of Excellence for Nuclear Security
PFEP	Pilot Fuel Enrichment Plant
RISS	Advisory Mission on Regulatory Infrastructure for Radiation Safety and Nuclear Security
PLA	People's Liberation Army
PMDA	Plutonium Management and Disposition Agreement
PNRA	Pakistan Nuclear Regulatory Agency
PSI	Proliferation Security Initiative
RECA	Radiation Exposure Compensation Act
RECNA	Research Center for Nuclear Weapons Abolition
RISS	Advisory Mission on Regulatory Infrastructure for Radiation Safety and Nuclear Security
SAG	Scientific Advisory Group
SIPRI	Stockholm International Peace Research Institute
SLA	State-Level Approach
SLBM	Submarine-Launched Ballistic Missile
SLC	State-Level Concept
SLCM	Sea-Launched Cruise Missile
SMR	Small Modular Reactors
SQP	Small Quantity Protocol
SRBM	Short-Range Ballistic Missile
SSBN	Nuclear-Powered Ballistic Missile Submarine
SSN	Nuclear-Powered Attack Submarine
SSOD	United Nations Special Sessions on Disarmament
SSP	Stockpile Stewardship Program
START	Strategic Arms Reduction Treaty
TPNW	Treaty on the Prohibition of Nuclear Weapons
UAE	United Arab Emirates
UAV	Unmanned Aerial Vehicle
UCF	Uranium Conversion Facility
UNOCT	United Nations Office of Counter-Terrorism
UNODC	United Nations Office for Drugs and Crime
UOC	Uranium Ore Concentrate
UTR-KINKI	The Kinki University Reactor
VLS	Vertical launching system
VOA	Voluntary Offer Agreement
WA	Wassenaar Arrangement
WINS	World Institute for Nuclear Security
WMD	Weapons of Mass Destruction
WTO	World Trade Organization
ZNPP	Zaporizhzhia Nuclear Power Plant