

# 2020 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons

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## Actions 5, 20 and 21 of the action plan of the 2010 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons\*

### Report submitted by the United States of America

As provided in the 2010 Nuclear Non-Proliferation Treaty (NPT) Review Conference (RevCon) Action Plan, the Governments of the five NPT nuclear-weapon states, or “P5,” are working to implement Action 5 to “[f]urther enhance transparency and increase mutual confidence” and to make national reports on our Action 5 and other undertakings consistent with Actions 20 and 21. Action 21 states, “As a confidence-building measure, all the nuclear-weapon States are encouraged to agree as soon as possible on a standard reporting form and to determine appropriate reporting intervals for the purpose of voluntarily providing standard information without prejudice to national security.” The framework we use for our national reports includes common categories of topics under which relevant information is reported, and it addresses all aspects of the NPT: disarmament, non-proliferation, and peaceful uses of nuclear energy. We encourage all States Parties, consistent with Action 20, to make similar reports.

Having provided our initial report to the 2014 NPT Preparatory Committee (PrepCom) meeting and an update for the 2015 NPT Review Conference, we now provide an update, including on actions over the past six years, for the Tenth NPT Review Conference.

### Section I: Reporting on National Measures Relating to Disarmament

#### i. Nuclear Security Policies, Doctrine and Activities Associated with Nuclear Weapons

##### *Nuclear Policy*

- U.S. policy is to work to achieve the peace and security of a world without nuclear weapons, in line with our NPT commitments. In the face of a tense and challenging international security environment, it is more urgent that the United States and other nuclear-weapon States pursue a persistent, pragmatic, proactive, and progressive approach to nuclear disarmament, building on

\* The present document is issued without formal editing.



negotiated agreements and cooperative activities, in order to reduce the risk of any use of nuclear weapons.

- President Biden's Interim National Security Strategic Guidance states that the United States will address the existential threat posed by nuclear weapons and will take steps to reduce the role of nuclear weapons in our national security strategy, while ensuring our strategic deterrent remains safe, secure, and effective and that our extended deterrence commitments to our allies remain strong and credible. The ongoing United States National Defense Strategy Review includes a Nuclear Posture Review (NPR) which is guided by this direction.
- The United States will identify specific areas where it could take steps to reduce the role of nuclear weapons while ensuring U.S. deterrence and extended deterrence remains effective and credible.
- The United States expects to release this Review in late January 2022.
- Without prejudging the outcome of the NPR, the following have been long-standing elements of U.S. policy on nuclear weapons:
  - The United States seeks to reduce the role of nuclear weapons in its national security strategy.
  - The United States seeks the reduction of global nuclear stockpiles in a way that promotes international stability, peace, and security.
  - The fundamental role of U.S. nuclear weapons has been to deter nuclear attack on the United States and its allies and partners.
  - The United States has said it would only consider the employment of nuclear weapons in extreme circumstances to defend the vital interests of the United States, its allies, and partners.
  - The United States has affirmed that a nuclear war cannot be won and must never be fought.
  - It is in the global interest that the over 75-year record of non-use of nuclear weapons be extended forever.
  - U.S. policy is to maintain a credible deterrent for the United States and its allies and partners with the lowest possible number of nuclear weapons, consistent with our current and future security requirements.
  - The initiation and conduct of nuclear operations would adhere to the law of armed conflict and the U.S. Uniform Code of Military Justice.
  - Underscoring the security benefits of adhering to and fully complying with the NPT, the United States has issued a "negative security assurance" by declaring that the United States will not use or threaten to use nuclear weapons against non-nuclear-weapon states that are party to the NPT and in compliance with their nuclear non-proliferation obligations.
  - The United States has also made clear its readiness to provide legally binding negative security assurances through support for relevant protocols to the five existing nuclear-weapon-free zone treaties.

#### ***Nuclear Force Posture and Alert Posture***

- Following the signing of the NPT, and through the implementation of effective arms control agreements, the United States has reduced its nuclear arsenal from its peak in 1967 of 31,255 warheads in 1967 to 3,750 as of the end of fiscal year

2020, a more than eight-fold reduction. We continue to limit the potential for accidental launch by maintaining the safety, security, and use control of the U.S. arsenal, while also taking steps to maximize the decision time available to the President in the event of a crisis.

- Actions and practices affecting the posture of U.S. nuclear forces continue to include the following:
  - Configuring all deployed intercontinental ballistic missiles (ICBMs) so that each missile only carries a single nuclear warhead (a process known as “de-MIRVing,” whereby we have removed from each missile all independently targetable reentry vehicles but one). Reducing the concentration of deployed warheads increases stability by lowering possible incentives for others to launch a nuclear first strike;
  - Continuing our longstanding practice of “open-ocean targeting” of all deployed ICBMs and submarine-launched ballistic missiles (SLBMs), such that in the extremely unlikely event of an accidental launch, the missile’s payload would land in the open ocean;
  - Continuing the practice of keeping all nuclear-capable bombers and dual-capable aircraft off day-to-day alert in peacetime;
  - Taking steps to maximize decision time for the President in the event of a crisis;
  - Deciding, in conjunction with NATO, not to deploy land-based nuclear-armed missiles within Europe;
  - The planned United States modernization program will not increase the number of ICBMs.
  - Having no program to develop nuclear-armed nuclear-powered cruise missiles or torpedoes;
  - Having no program or intent to deploy nuclear warheads on hypersonic glide vehicles or hypersonic cruise missiles.

### ***Nuclear Weapons Surety***

- Nuclear Surety is the assurance that a nuclear weapon will operate safely, securely, and reliably if deliberately activated and that no accidents, incidents, or unauthorized detonations will occur.
- The United States continues to take a variety of measures to ensure that nuclear weapons remain safe, secure, and under positive control at all times - this continues to be an overriding national priority.
- U.S. advancement of surety technologies minimize the probability of unauthorized use of a nuclear weapon while maintaining the highest levels of continuous safety.
- U.S. surety programs create, develop, and mature advanced safety, security, and use-control or denial technologies to minimize the probability of an accidental nuclear explosion, given exposure to an abnormal environment. In the unlikely event that security fails and unauthorized access is gained, these technologies reduce the risk of an unauthorized nuclear yield to the lowest possible level.
- The U.S. employs a variety of safety and use control programs and features that prevent accidental nuclear detonation and unauthorized use of nuclear weapons while deploying new technologies that continue to enhance overall safety and security of the stockpile:

- Life Extension Programs (LEPs) and Major Modifications (MODs) ensure all weapons in the U.S. stockpile meet updated safety and security standards. For example, the W87-1 Modification Program will replace the aging W78 warhead using a modification of the existing legacy W87-0 design to improve safety and security.
- As part of U.S. stockpile surveillance, the U.S. identifies manufacturing and design defects that could affect safety, security, performance, or reliability and assess risks to the safety, security, and performance of the stockpile. When anomalies in surveillance data are identified, a science and engineering analysis is conducted to determine whether observations are serious enough to open an investigation to address specific weapon or component issues. Investigations are closed once the impacts to system performance or safety have been assessed and follow-up actions are determined, if necessary.
- Insensitive high explosives (IHE) are used in the majority of U.S. weapons. IHE is much less sensitive to shock or heat and highly resistant to accidental detonation such that the probability of accidental is negligible. The U.S. is exploring material technologies to accelerate scale-up of synthesis, formulation, and qualification of candidate IHEs to reduce the reliance on conventional explosives in future system designs.
- Weapons surety design, analysis, integration, and manufacturing programs employ a variety of safety and use control systems to prevent accidental nuclear detonation and unauthorized use of nuclear weapons to ensure a safe and secure stockpile.
- The U.S. stockpile is assessed annually to ensure that safety and use control devices and components meet requirements and are performing effectively. Surety requirements are addressed during all phases of the U.S. nuclear weapon life cycle.
- In keeping with long-standing U.S. commitments to transparency, the annual Stockpile Stewardship and Management Plan and its companion document, the Prevent, Counter, and Respond Plan, further detail U.S. plans to: ensure the safety, security, and effectiveness of the U.S. nuclear weapons stockpile; maintain the scientific and engineering tools, capabilities, and infrastructure that underpin the nuclear security enterprise, and; reduce the threats of nuclear proliferation and nuclear terrorism.

**ii. Nuclear Weapons, Nuclear Arms Control (including Nuclear Disarmament) and Verification**

***Nuclear Weapons Reductions***

- The United States continues a decades-long, persistent, pragmatic, and progressive effort to reduce and eventually eliminate nuclear weapons. We have reduced our nuclear weapons stockpile by over 88 percent since its Cold War peak, or about an 83 percent reduction since 1970, when the NPT entered into force.

***New START Treaty***

- A major step along this path is the U.S.-Russia New START Treaty, which since 2018 has capped U.S. and Russian deployed strategic warheads at 1,550, the lowest levels of these weapons since the late 1950s. The United States and Russia in 2021 extended the treaty to 2026.
  - To meet the requirements of the New START Treaty, the United States removed 50 ICBMs from their silos, verifiably made four launch tubes on

each of our 14 strategic ballistic missile nuclear submarines (SSBNs) incapable of launching an SLBM, and verifiably made 41 B-52 heavy bombers incapable of employing nuclear armaments, limiting them to a conventional-only role.

- As of September 2021, the United States had a total of 1,389 warheads on deployed ICBMs, deployed SLBMs, and nuclear warheads counted for deployed heavy bombers. These warheads were deployed on a total of 665 ICBMs, SLBMs, and heavy bombers.
- The United States, through the Strategic Stability Dialogue with Russia, seeks to lay the groundwork for future nuclear arms control that addresses all categories of U.S. and Russian nuclear warheads.
- These actions extend the legacy of U.S. leadership on nuclear arms control and disarmament, which includes many other signal achievements to increase transparency and reduce the potential for misunderstanding, regulate competition, codify rough parity in strategic nuclear arms, close off areas of competition, and prevent arms races.
- The United States will continue working to increase transparency and predictability, where appropriate, to avoid potential miscalculation among nuclear-weapon states and other possessor states through strategic dialogues, risk-reduction communications channels, and sharing best practices related to nuclear weapons safety and security.

#### ***Past Nuclear Arms Control Agreements and Disarmament-Related Measures***

- The 1991 Strategic Arms Reduction Treaty (START I), the most sweeping and complex arms control agreement negotiated in history, limited the United States and Russia to no more than 1,600 deployed ICBMs, SLBMs, and heavy bombers, and no more than 6,000 nuclear warheads attributed to those strategic delivery vehicles.
  - Between September 1990 and July 2009, the United States under START reduced the number of deployed strategic offensive arms (ICBMs, SLBMs, their associated launchers, and deployed heavy bombers) in its arsenal from 2,246 to 1,188, a 47 percent reduction, and reduced nuclear warheads attributed to these launchers from 10,563 to 5,916, a 44 percent reduction.
- The 2002 Strategic Offensive Reductions Treaty (or Moscow Treaty) limited the United States and Russia to no more than 1,700 to 2,200 strategic nuclear warheads by 2012.
  - The U.S. aggregate number of operationally deployed strategic nuclear warheads was 1,944 as of February 2011, when the Moscow Treaty was superseded by the entry into force of the New START Treaty.
- National Measures: In addition to treaty-based reductions, the United States has made other dramatic and deep cuts to its nuclear arsenal, including through the 1991 and 1992 “Presidential Nuclear Initiatives” (PNIs), which eliminated approximately 3,000 U.S. nuclear weapons and resulted in an approximately 90 percent reduction in all U.S. non-strategic nuclear weapons, and through other voluntary initiatives. These national measures included:
  - Elimination of all 450 Minuteman II ICBM silo launchers and all 50 Peacekeeper ICBM silo launchers, as well as 50 Minuteman III ICBM silo launchers;

- Removal of four SSBNs from nuclear service and reducing the number of total launch tubes on each of the remaining deployed submarines;
- Retirement of all FB-111A bombers, elimination of all B-52G heavy bombers, and conversion of all B-1B heavy bombers to conventional-only capability;
- Withdrawal of all U.S. ground-launched tactical nuclear weapons;
- Elimination of all U.S. nuclear artillery shells and warheads for short-range ballistic missiles;
- Removal of all tactical nuclear weapons from all U.S. surface ships and attack submarines;
- Removal of all nuclear command and control aircraft from constant airborne alert;
- Retirement of the AGM-129 Advanced Cruise Missile and the AGM-69 Short-Range Attack Missile (both air-to-ground missiles).

### ***U.S. Nuclear Stockpile Transparency***

- The United States reaffirms its commitment to transparency by again providing public data on the aggregate number of active and inactive warheads in the U.S. nuclear weapons stockpile during the 76th Session of the UN First Committee, which demonstrate an approximate 88 percent reduction from its maximum in 1967. See 2021 U.S. Nuclear Stockpile Fact Sheet.<sup>1</sup>
- As of the end of Fiscal Year (FY) 2020, the total U.S. stockpile of active and inactive nuclear warheads was 3,750, its lowest level since the 1950s, and an approximate 18 percent reduction since the 2015 NPT Review Conference.
- The United States dismantled a total of 11,683 warheads between 1994 and 2020, including an approximate 1,400 warheads since the 2015 NPT Review Conference.
- In addition, approximately 2,000 warheads are retired and awaiting dismantlement. Retired warheads have been removed from their delivery platforms, are not ready to fire, and are in the queue for dismantlement.
- The United States also declassified and publicly released similar data during the 2010 NPT Review Conference, 2014 NPT PrepCom meeting, and the 2015 NPT Review Conference.
- Since 1992, the United States has retired and dismantled 12 nuclear weapon types, including most recently: the W79, W62, W56, and B53.
- The last W80-0 warhead for the Tomahawk Land Attack Missile-Nuclear (TLAM-N) was retired from service in 2011 and was dismantled in 2012.
- The Stockpile Stewardship Program and Department of Energy (DOE)/National Nuclear Security Administration (NNSA) modernization programs allow the United States to replace aging infrastructure and extend the life of the existing warheads while maintaining a safe, secure, reliable, and effective deterrent, without the need to resume underground nuclear explosive testing.

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<sup>1</sup> <https://www.energy.gov/sites/default/files/2021-10/20211006%20-%20U.S.%20Nuclear%20Stockpile%20Fact%20Sheet.pdf>.

### ***Fissile Material Reductions***

- In addition to information on its nuclear weapons stockpile, the United States has made public the total amounts of U.S. plutonium and highly enriched uranium (HEU) produced by its weapons program for military or non-military use.
- The United States reported its plutonium inventory as of 2009 was 95.4 metric tons (MT). In 1994 and 2007, the United States declared 61.5 MT of plutonium as excess to defense needs and not for use in nuclear warheads.
- The U.S.-Russian Plutonium Management and Disposition Agreement (PMDA) requires the United States and Russia each to dispose of no less than 34 MT of weapon-grade plutonium that each country has declared excess to defense needs. Despite Russia's announcement in October 2016 that it was "suspending" implementation of the PMDA, the United States remains committed to its international obligations, including to seek an IAEA role in verifying the disposition of the 34 MT.
- In addition to this 34 MT of surplus plutonium, the United States also is disposing of an additional six MT of surplus non-pit plutonium by the dilute-dispose method. Although monitoring has not yet commenced, discussions are advancing between the Department of Energy (DOE) and the IAEA on how to best implement monitoring to demonstrate international transparency on the permanent disposal of such fissile material.
- U.S. implementation of the U.S.-Russia Plutonium Production Reactor Agreement (PPRA) is ongoing. Under this agreement, all weapon-grade plutonium produced since 1995 by the last three (now-shutdown) Russian reactors remains under U.S. monitoring and outside of military programs. Almost all of the combined 27 shutdown reactors on each side have been verified to have been irreversibly dismantled; the three remaining reactors (one in Russia and two in the United States) are under bilateral monitoring.
- The total U.S. HEU inventory as of September 30, 2013, was 585.6 MT.<sup>2</sup>
- In 1994, the United States declared 174.3 MT of HEU excess to National Security needs. In 2005, the United States announced that an additional 200 MT of the HEU would be removed from use as fissile material in nuclear warheads. From these declarations, 186 MT is designated for downblend, of which 165.4 MT had been completed at the End-of-Fiscal-Year (EFY) 2021, enough material for more than 6,500 nuclear weapons. Downblending permanently removes this material from potential further use in nuclear warheads.
- In 2013, the United States and Russia successfully completed the major non-proliferation, peaceful use, and disarmament goals of the 1993 U.S.-Russia HEU Purchase Agreement. Under this landmark agreement, 500 MT of Russian weapons-origin HEU was converted to low-enriched uranium (LEU) and by the end of 2013, shipped to the United States where it was used for peaceful purposes as fuel in U.S. nuclear power reactors.
  - During the ten-year period from 2003-2013, approximately half of all nuclear energy, and ten percent of all electricity produced in the United States came from nuclear fuel that resulted directly from the elimination of former Soviet nuclear warheads.
  - Under the agreement, both countries exercised reciprocal transparency monitoring in each other's nuclear facilities to ensure that all HEU

<sup>2</sup> Per, "Fact Sheet: Transparency in the U.S. Highly Enriched Uranium Inventory," March 31, 2016, The White House: Office of the Press Secretary.

processed in Russia was of weapons-origin and that all LEU produced from that material was used for exclusively peaceful purposes in the United States.

- The United States and Russia concluded an exchange of notes in December 2019 to close out the HEU Purchase Agreement officially and acknowledge the completion of its goals.

### ***Facility Consolidation***

- The United States has also consolidated the number of sites needed to maintain the U.S. stockpile. The current nuclear weapons complex is smaller and geared to support not only our enduring nuclear weapons stockpile through science-based stewardship, but also our capability to address proliferation, terrorism, and other global threats.
- 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.
- From a high point of approximately 10,600 square kilometers (km) in the early 1980s, the size of the complex has shrunk to 5,400 square km, approximately half its original size.

### ***Multilateral Arms Control and Disarmament***

- The United States continues to reaffirm its commitment to negotiate a treaty banning the production of fissile material for use in nuclear weapons or other nuclear explosive devices, also known as the Fissile Material Cutoff Treaty (FMCT), provided that the negotiations are governed by consensus and all the key states participate.
- An end to the production of fissile material for use in nuclear weapons or other nuclear explosive devices remains an essential step toward achieving the ultimate goal of a world without nuclear weapons.
- Since the early 1990s, the United States has maintained a unilateral moratorium on the production of fissile material for use in nuclear weapons or other nuclear explosive devices and continues to call upon all states that have not yet done so to declare and maintain such moratoria immediately.
- In the interim, the United States actively participated in two United Nations General Assembly FMCT initiatives. The first was a Group of Governmental Experts that met from 2014-2015 and the second was a High Level FMCT Expert Preparatory Group that met from 2017-2018. We believe these groups laid important groundwork for future FMCT negotiations.
- The United States has not conducted a nuclear explosive test since 1992. The United States continues to observe its zero-yield nuclear explosive testing moratorium and calls on all states possessing nuclear weapons to declare or maintain such a moratorium.
- The United States supports the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and is committed to work to achieve its entry into force, recognizing the significant challenges that lie ahead in reaching this goal. We continue to support the CTBT Organization's Preparatory Commission (CTBTO PrepCom) in its work to establish the treaty's verification regime.
- The United States is the largest financial contributor to the CTBTO PrepCom, paying more than 22 percent of the Commission's annual budget.



- The total amount the United States has paid in assessments to the PrepCom is approximately \$455 million.
- In addition to its PrepCom assessments, since 2011, the United States has made voluntary contributions of more than \$63 million to support a variety of CTBTO PrepCom projects, including the reengineering of the International Data Centre (IDC)'s analysis software, the critical repair of the International Monitoring System (IMS) Hydroacoustic Station at Diego Garcia (HA08), and the rebuilding of the Crozet Island hydroacoustic station. These voluntary contributions have included more than \$12 million since 2015.
- The United States continues to maintain high data availability from the IMS stations for which it is responsible, ensuring the continuous flow of high-quality data to the global community without interruption.
- In 2021, the United States attended the International Day Against Nuclear Testing event hosted by Kazakhstan and the CTBT Article XIV Conference to help highlight the importance of the CTBT and the entry into force of a legally binding ban on nuclear explosive testing in all environments.
- Also in 2021, and for the first time in years, the United States joined consensus on the UNGA First Committee resolution regarding a Fourth Special Session of the General Assembly devoted to Disarmament (SSOD-IV). UNGAR 76/38 "Encourages Member States to continue consultations on the next steps for the convening of" an SSOD IV. The United States stands ready to participate in such discussions, on the basis of consensus.

#### ***Verification, Including Research and Development***

- Effective verification is an essential condition for nonproliferation, arms control, and achieving a world without nuclear weapons. Verification methods and technologies capable of detecting violations and monitoring compliance must be in place as states move toward nuclear disarmament.
- The United States also seeks progress in enhanced transparency through information sharing and confidence-building measures. Such transparency can contribute to stability and security through enhancing predictability and building trust and confidence.
- Looking to the future and in keeping with our NPT commitments, the United States is supporting a range of research and development activities, expanding our work on verification technologies needed for future arrangements. We are making multi-million-dollar investments each year to advance these capabilities.
- The United States participated in, and supports the continuation of, the UN Group of Governmental Experts (GGE) to Consider the Role of Verification in Advancing Nuclear Disarmament, which considered the development and strengthening of practical and effective nuclear disarmament verification measures, and the importance of such measures in achieving and maintaining a world without nuclear weapons. This group met for three sessions in 2018–2019 and adopted a report by consensus that confirmed verification is essential to nuclear disarmament. It also urged states to consider further work related to the role of verification in advancing nuclear disarmament. We look forward to the second such GGE, the commencement of which has been delayed due to the COVID-19 pandemic.
- Verification under the New START Treaty increases stability and predictability between the world's two largest nuclear powers. The treaty's robust and extensive verification provisions provide mutual confidence that both sides are living up to their obligations. The accurate and timely information shared

between the United States and Russia on each side's respective nuclear forces diminishes the risks of misunderstanding and misperception. The treaty's verification regime includes.

- Eighteen short-notice on-site inspections each year of both deployed and non-deployed ICBMs, SLBMs, and heavy bombers for each party that are more intrusive than those conducted under the previous START agreement, allowing each party to confirm the actual number of deployed warheads on ICBMs and SLBMs or nuclear armaments on heavy bombers;
  - Exhibitions and demonstrations of certain items subject to the treaty;
  - Use of National Technical Means (NTM) to improve verification effectiveness, with an obligation not to interfere with the other party's use of NTM for verification purposes, and an obligation not to use concealment measures to impede verification using NTM;
  - A database and an extensive system of notifications to inform the other party when various events or changes occur, such as movements, flight tests, deployments, and eliminations of treaty-accountable items. As of November 2021, the United States and Russia have exchanged nearly 23,000 such notifications through their respective Nuclear Risk Reduction Centers in Washington, DC, and Moscow.
- As of November 2021, more than 320 on-site inspections have been conducted by the United States and Russia under the New START Treaty. Treaty on-site inspections and other verification measures enable confidence in the validity of the data exchanged by the United States and Russia.
  - The United States also continues to seek advances to support effective multilateral verification mechanisms, as well as the development of effective verification methods and technologies capable of monitoring compliance and detecting violations.
  - Through the International Partnership for Nuclear Disarmament Verification (IPNDV), the United States has engaged nuclear-weapon possessor and non-possessor states to address and advance future nuclear disarmament verification.
  - In the six years since the Partnership began, more than 100 experts from 30 countries and the European Union have engaged in collaborative work to develop potential solutions to the many challenges associated with future nuclear disarmament verification. This work is detailed in more than 50 reports and papers outlining procedural and technical mechanisms to address and solve some of the most complex verification challenges, like the dismantlement of nuclear warheads.
  - In its first multi-year phase, the Partnership determined that multilateral verification of nuclear warhead dismantlement, while challenging, should be possible while protecting proliferation-sensitive information, as well as complying with safety and security requirements.
  - During its second phase, the partners explored monitoring and verification considerations and moved their work from paper to practice, conducting five practical exercises and technology demonstrations to test many of the technologies and procedures developed in Phase I, including:
    - A Nuclear Disarmament Verification Exercise (NuDiVe 2019), co-hosted by Germany and France, to assess technology options and verification approaches;
    - A tabletop exercise in Utrecht, Netherlands, which explored the cross-cutting elements within IPNDV's 14-step dismantlement framework;

- A demonstration of high explosives detection methods, organized by the Netherlands Organization for Applied Scientific Research;
  - A technology experiment to investigate methods for verifying the presence and/or absence of Special Nuclear Material, sponsored by the Belgian Nuclear Research Centre;
  - A demonstration of the applicability of muon tomography in identifying the presence or absence of Special Nuclear Material in a container, organized by the Canadian Nuclear Laboratories.
- IPNDV Phase III formally launched in March 2020 and focuses even more on the conduct of practical exercises and technical demonstrations to explore concepts for addressing and achieving progress in future nuclear disarmament verification. Despite COVID-related restrictions, the Partners continued meeting in a virtual format, and even conducted two additional virtual tabletop exercises in December 2020 and June 2021.
  - Since 2000, the United States and the United Kingdom have engaged in an extensive program of cooperation under the 1958 Mutual Defense Agreement to develop and evaluate methodologies and technologies required to verify future nuclear weapon reduction initiatives. This work includes:
    - Evaluating managed-access procedures at nuclear weapons facilities;
    - Developing procedures to confirm declared nuclear weapon attributes;
    - Examining the chain of custody for nuclear weapons and components;
    - Evaluating the monitored storage of nuclear weapons, components, and materials;
    - Developing procedures for the authentication of inspection equipment;
    - Enabling the testing of technology in operational environments.
  - In 2015, the United States began working with the United Kingdom, Norway, and Sweden as part of the Quad Nuclear Verification Partnership to further investigate potential nuclear weapon monitoring and verification requirements and approaches in greater depth. This initiative included completion of the Quad Letterpress Exercise in the United Kingdom in 2017, and the development of a multi-year plan of work based on lessons that the Quad learned is now being pursued through the Verification Strategies and Verification Technologies working groups.
  - U.S. verification research initiatives develop capabilities to address major technical challenges, such as monitoring of warheads, including non-deployed warheads in storage, and dismantlement verification.
    - In 2019, the United States completed a nuclear warhead modeling and measurement campaign to establish a comprehensive nuclear warhead and component signature set. The resulting data will support assessment of sensitive information that could be revealed as a result of future treaty verification activities and will further guide future research and development in the areas of radiation detection and information protection.
    - In 2021, the United States completed a demonstration exercise of a “baseline” set of technologies and capabilities that could support total nuclear warhead stockpile monitoring and verification and completed work to identify and prioritize continuing research and development (R&D) for higher confidence monitoring and verification capabilities that will help guide advanced R&D over the next five to ten years.

- The United States is also pursuing advances in research and development to enhance other current and future arms control arrangements. This included technologies to support the CTBTO PrepCom's IMS and IDC, such as completion of field experiments, modeling, and demonstrations to further our understanding of underground nuclear event signatures, as well as assessing the effects on the IMS of industrial radionuclide sources worldwide.

### iii. Transparency and Confidence-Building Measures

#### *The P5 Conference Process*

- The United States is committed to the P5 Conference Process and moving from discussions to actions. We will continue to pursue meaningful dialogue among the five NPT nuclear-weapon states to enhance confidence and international security, and to achieve concrete, tangible results. We will seek progress on the NPT's nuclear nonproliferation, disarmament, and peaceful use obligations and commitments. The P5 Conference Process can help to prepare the way for future multilateral arms control negotiations.
- Through the P5 Conference Process, on several occasions the five states have exchanged their national perspectives to gain better understanding and build trust.
- The NPT nuclear-weapon states continue to pursue regular dialogue on nuclear-weapon-related issues. France hosted the tenth P5 Conference in Paris in December 2021. The United States was pleased to host the P5 Conference in Washington in September 2016 and looks forward, after the 2022 NPT Review Conference, to assuming the P5 Conference Process chair and hosting the eleventh conference. As chair, we will seek to continue to move the process from discussions to actions.
- The NPT nuclear-weapon states continue to engage on a number of issues, including prevention of nuclear war, nuclear doctrine, risk reduction, and peaceful uses. We hope to increase mutual understanding of each other's nuclear doctrines through a side event planned for the 2022 NPT Review Conference.
- The United States has implemented a wide array of risk reduction agreements and arrangements and will consider how any of them might be used as models and adapted for use among by the P5, or more broadly, as appropriate. We will also explore new measures for adoption through this process.
- The United States recognizes risk reduction is no substitute for nuclear disarmament, but the reduction of strategic risks does enhance international security and helps to pave the way for future nuclear arms control and disarmament agreements.
- The United States has contributed to the P5's "Glossary of Definitions of Key Nuclear Terms." The NPT nuclear-weapon states released a first edition of the glossary at the 2015 NPT Review Conference and will release a second edition of the Glossary at the 2022 NPT Review Conference. This work contributes to NPT goals by improving mutual understanding of key arms control, disarmament, and non-proliferation concepts and concerns.
- The United States and Russia have briefed the other nuclear-weapon states on their nuclear arms control verification and notification experience to foster greater familiarity with practical measures that promote the predictability, transparency, and verifiability of the arms control and disarmament process.

- In prior years, the United States, along with the other nuclear-weapon states, held a series of biannual meetings of technical experts to discuss and identify areas for future collaboration on CTBT-related issues. The United States presented a number of briefings on the ways the five states could collaborate to improve upon the CTBT verification system.
- On December 3, 2021, the P5 issued a joint communique emphasizing “the primacy of the NPT as the cornerstone of the international nuclear non-proliferation and disarmament regime” and outlining their efforts to ensure a meaningful outcome of the Tenth RevCon.
- Engagement among the five NPT nuclear-weapon States Parties is a long-term investment in strengthening the NPT, building trust, and creating a stronger foundation for the work required to achieve a world without nuclear weapons. We will continue working to advance meaningful engagement through the P5 Conference Process that results in substantive and tangible results.

### ***Creating an Environment for Nuclear Disarmament***

- The United States launched the Creating an Environment for Nuclear Disarmament (CEND) initiative to improve and solve challenges relating to the security environment and identify possible pathways for further progress toward nuclear disarmament. Through side events and working papers submitted to the 2018 and 2019 NPT Preparatory Committee meetings, the United States laid out the principles and objectives of this initiative. The United States also consulted widely among NPT Parties, states not party to the NPT, and civil society on the best way to organize and structure our efforts.
- The CEND Working Group held its first meeting in Washington in July 2019 and its second at Wilton Park in the United Kingdom in November 2019. Forty-three countries representing a wide array of positions on advancing disarmament, including NPT non-nuclear-weapon States Parties, all five NPT NWS States Parties, and states not party to the NPT, have attended these meetings and continue to participate in the CEND Working Group.
- At the first two meetings, the CEND Working Group participants established three subgroups to examine different CEND-related themes:
  - Reducing perceived incentives for states to retain, acquire, or increase their holdings of nuclear weapons and increasing incentives to reduce and eliminate nuclear weapons;
  - Mechanisms to bolster non-proliferation efforts and build confidence in, and further advance, nuclear disarmament;
  - Interim measures to reduce risks associated with nuclear weapons.
- Since mid-2020, the three CEND subgroups have met separately in a virtual format, due to pandemic-related travel restrictions. Participants developed concept notes laying out the general guidelines for the subgroups to follow and Programs of Work describing the specific tasks and activities each subgroup is undertaking. Substantive discussion sessions began in mid-2020, with discussion covering a range of topics, including nuclear threat perceptions, nuclear non-proliferation and disarmament mechanisms and institutions, and analyzing nuclear risk reduction measures.
- The meetings of the CEND Working Group have demonstrated the value of an open and constructive dialogue on creating an environment for nuclear disarmament. The participants are using this dialogue to frame collaborative efforts to develop recommendations that can enable real and sustainable

progress toward disarmament. Substantive work will continue past the tenth NPT review cycle, and participants plan to report on the CEND Working Group's deliberations and conclusions in early 2023.

- IPNDV and CEND are the kinds of effective and progressive measures that contribute to stabilizing and improving the international security environment. The United States will continue to support such initiatives.

#### ***Other Confidence-Building Measures and Agreements***

- ***Direct Secure Communication Systems.*** The United States has bilateral agreements with both Russia (since 1963, starting with the Soviet Union) and China (since 1998) on the establishment of direct secure communications systems, also known as “Hotlines.” These are emergency and non-emergency secure communication systems intended for use by the highest leadership of the United States and Russia, and separately, of the United States and China. The systems are maintained by each government to provide channels for rapid communication to reduce risk or misunderstanding in crisis situations and to ensure that leaders are prepared to manage international crises.
- ***The U.S. National and Nuclear Risk Reduction Center (NNRRC)***, located in the Department of State, provides the U.S. Government with 24-hour, seven-day-a-week, direct communications in support of a number of international agreements and arrangements on nuclear, conventional arms control, chemical, and cyber issues, with Russia and other state successors to the Soviet Union, more than 50 participating States of the Organization for Security and Cooperation in Europe (OSCE), and the 143 subscribers to the Hague Code of Conduct against Ballistic Missile Proliferation (HCOC), as well as with the Organization for the Prohibition of Chemical Weapons (OPCW). The NNRRC processes thousands of notifications annually, providing translations for notifications in multiple languages covering multiple treaties and agreements. It also has the capacity to add additional partner countries and languages.
- ***The Prevention of Nuclear War Agreement*** between the United States and the Soviet Union (succeeded by Russia), which was signed and entered into force in 1973, obligates each State Party to “act in such a manner as to prevent the development of situations capable of causing a dangerous exacerbation of their relations, as to avoid military confrontations, and as to exclude the outbreak of nuclear war between them and between either of the Parties and other countries,” and to “proceed from the premise that each Party will refrain from the threat or use of force against the other Party, against the allies of the other Party and against other countries, in circumstances which may endanger international peace and security.” The agreement also obligates the parties to immediately enter into urgent consultations if there is a risk of nuclear war between them and to make every effort to avert this risk.
- ***The Accidents Measures Agreement*** (the Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War Between the United States of America and the Union of Soviet Socialist Republics, succeeded by Russia) was signed and entered into force in 1971. It provides, inter alia, for certain immediate or advance notifications, to be facilitated via the “Hotline.”
- ***The Agreement on Reciprocal Advance Notification of Major Strategic Exercises*** between the United States and the USSR (succeeded by Russia) was signed and entered into force in 1989. Pursuant to this agreement, the United States and Russia agreed to provide each other with notifications, no less than 14 days in advance, of major strategic forces exercises which include the participation of heavy bomber aircraft, thus reducing the risk of misinterpretation,

miscalculation, or accident. Notifications of major strategic exercises under the New START Treaty are provided in accordance with this 1989 agreement.

- ***The Ballistic Missile Launch Notification Agreement*** (Agreement on Notifications of Launches of Intercontinental Ballistic Missiles and Submarine-Launched Ballistic Missiles, or BMLNA) was signed and entered into force in 1988 between the United States and the USSR (succeeded by Russia). Pursuant to this agreement, the United States and Russia agreed to provide each other with notifications, no less than 24 hours in advance, of the planned date, launch area, and area of impact for any launch of an ICBM or SLBM. Notifications of launches under the New START Treaty are provided in accordance with the BMLNA.
- ***The Hague Code of Conduct against Ballistic Missile Proliferation*** was adopted at a November 2002 conference by 93 countries in The Hague (the number of Subscribing States has since increased to 143). Under the Code's voluntary transparency and confidence-building measures, the United States politically commits to pre-notify launches of ballistic missiles and space launch vehicles (the NNRRC assists in the notification process), as well as submit annual declarations of our space launch and ballistic missile policies.
- ***The Vienna Document 2011 on Confidence- and Security-Building Measures***, first adopted in 1990 and most recently revised and reissued in 2011, is a politically binding arrangement that provides for the exchange of information about military forces, notification and observation of military activities such as exercises, inspections of specified areas, evaluation visits to military units, and a risk reduction consultative mechanism in the case of unusual military activities. All 57 participating States of the OSCE, including the United States, Canada, and Russia, have made a political commitment to implement the measures in the Vienna Document.
- ***The Treaty on Conventional Armed Forces in Europe (CFE)*** has been a cornerstone of European security since 1990 by providing transparency about conventional military weapons and equipment through limitations on conventional arms in 30 countries, data exchanges, and intrusive verification measures. The area of application stretches from the Atlantic Ocean to the Ural Mountains. Russia purportedly "suspended" its CFE obligations in 2007, although suspension was not a legally available measure under the Treaty or under customary international law.
- ***The U.S.-Russia Presidential Declaration on Mutual De-targeting***, issued in January 1994, announced the commitment of both sides to ensure that, by May 1994, the United States and Russia no longer targeted their respective ICBMs and SLBMs at each other. In the highly unlikely event of an accidental launch of a U.S. nuclear weapon, the weapon would land in the open ocean.

#### iv. Other Related Issues

##### ***Examples of Resources Devoted to Disarmament Treaty Implementation, Inspections, and Dismantlement***

- The United States expends considerable resources in fulfilment of its commitments under the many disarmament and arms control agreements and arrangements that it has implemented. Below are a few examples of U.S. expenditures relating to nuclear disarmament.
- The United States continues to dismantle nuclear weapons that are currently in the retirement queue. The United States has spent several hundred million dollars on weapons dismantlement and component disposition since 2015.

- The United States transitioned its deployed nuclear force structure to meet the central limits of the New START Treaty, which took effect in 2018.
  - Since 2014, the United States has eliminated 52 ICBM silos for the Minuteman III and one silo for the Peacekeeper, completing the elimination of 103 ICBM silos to date under the New START Treaty.
  - In addition, the United States converted 56 launchers on U.S. ballistic-missile submarines (SSBNs) to render them incapable of launching an SLBM and converted 41 B-52H heavy bombers to render them incapable of employing nuclear armaments, limiting them to a conventional-only role. The cost of these conversions exceeded \$53 million.
  - From 2011 to 2020, the Defense Threat Reduction Agency (DTRA) spent more than \$74 million conducting more than 160 on-site inspections and hosting more than 170 inspection-related activities under the New START Treaty.
  - Since 2015, the U.S. Air Force has spent more than \$200 million annually on verification of other States' compliance with nuclear arms control and non-proliferation agreements and commitments.
- Since 2000, the United States has spent approximately \$50 million on cooperative work with the United Kingdom to evaluate methodologies and technologies required to verify future nuclear weapon reductions.
- Since 2015, the United States has spent approximately \$20 million on the NNSA's work with its National Laboratories to look at procedures and technologies required to verify nuclear weapons reductions, including for the monitored dismantlement of nuclear weapons.
- The Department of Energy is making demonstrable progress in its transition to the "dilute and dispose" strategy for surplus plutonium disposition, with investments in facilities, infrastructure, and critical staffing necessary to increase the rate and efficiency of disposition.

## **Section II: Reporting on National Measures Relating to Non-proliferation**

- The United States places a very high priority on preventing the spread of nuclear weapons, including fulfillment of all of the NPT's obligations. For this purpose, we devote considerable resources and policy efforts to IAEA safeguards, nuclear export controls, nuclear security, countering nuclear terrorism, nuclear-weapon-free zones, compliance with nonproliferation obligations, and UN Security Council Resolution 1540.
- Since 2015, the United States has provided about \$765 million in assessed budget payments to the IAEA, which is about 25 percent of the total IAEA assessed budget payments. These assessed contributions support the IAEA's missions across the board, including nonproliferation and promotion of the peaceful uses of nuclear energy. In addition to these assessed regular budget payments, since 2015 the United States has provided nearly \$700 million in voluntary, extra-budgetary contributions to the IAEA via cash and in-kind support. More in-depth details on these extra-budgetary contributions are included below, in this Section and in Section III.



## i. Safeguards

- The United States maintains an international safeguards program to develop the policies, concepts, technologies, expertise, and infrastructure necessary to strengthen and sustain the international safeguards system as it evolves to meet new challenges. This program has focused on renewing U.S. capabilities to support international safeguards and is intended to serve as a catalyst for a broader international commitment to support international safeguards.

### *Safeguards in the United States*

- The United States entered into its first safeguards agreement with the IAEA in 1962. This and a follow-on agreement in 1964 enabled the IAEA to develop its on-site inspection methods at select U.S. power and research reactor facilities.
- The United States brought into force a safeguards agreement in 1980 (also known as the U.S. Voluntary Offer Agreement, or VOA) and an Additional Protocol (AP) thereto in 2009 that apply to all civil nuclear facilities and activities in the United States, excluding only those of direct national security significance to the United States. These agreements contain the standard provisions for safeguards implementation and demonstrate our readiness to accept safeguards on civil nuclear activities.
  - The United States has made eligible for IAEA safeguards nearly 300 civil nuclear facilities, including power reactors, research reactors, commercial fuel fabrication plants, uranium enrichment plants, and other types of facilities. The list of U.S. nuclear facilities that are eligible for IAEA inspections is routinely updated and provided to the IAEA.
  - From this list of eligible facilities, the IAEA has currently chosen three fuel fabrication facilities and one enrichment facility for safeguards reporting, and one plutonium storage facility for the application of IAEA safeguards. The IAEA conducted inspection activities at these facilities to verify declared design information and reporting of material accountability information.
- The IAEA has conducted more than 970 inspections at 19 different nuclear facilities in the United States. Since 1994, this includes more than 685 IAEA inspections at five U.S. facilities containing material removed permanently from weapons programs. Since 2015, this includes more than 85 IAEA inspections at one U.S. facility containing material removed permanently from weapons programs. The United States covered the costs for these inspections through U.S. voluntary contributions to the IAEA.
  - This material includes nearly three MT of plutonium declared excess to defense needs under IAEA safeguards at the K-Area Material Storage (KAMS) Facility at the Savannah River Site in South Carolina. KAMS is the first plutonium storage facility in the world to implement remote monitoring, which enabled the IAEA to expand and develop remote monitoring techniques that will be useful in other facilities worldwide.
- The United States accepted all provisions of the IAEA's Model AP, excluding only instances where its application would result in access by the IAEA to activities, locations, or information with direct national security significance to the United States.
  - The United States reported 376 locations and activities in the U.S. initial declaration under its AP in 2009. The United States has transmitted an updated annual declaration to the IAEA each year since, with approximately three hundred declaration line items in each subsequent year.

- The United States hosted two complementary access visits from the IAEA under the U.S. AP in 2010. These were the first such visits conducted in the territory of an NPT nuclear-weapon state.
- The United States has also made regular quarterly reports to the IAEA of the export of items enumerated in Annex II of the U.S. AP.
- In addition, the United States has a comprehensive safeguards agreement covering its Caribbean territories, concluded pursuant to Additional Protocol I to the Treaty of Tlatelolco. Because there are no significant nuclear activities in these territories, the United States concluded a Small Quantities Protocol (SQP) to that safeguards agreement. In 2018 the United States updated that SQP to the modified version, and since then the United States has provided an initial report and periodic updates.

### ***Support for IAEA Safeguards***

- Since 1977, the United States has provided new tools, technology, experts, and other resources through the United States Support Program (USSP) to IAEA safeguards to improve the effectiveness and efficiency of safeguards implementation.
- Since 2015, the United States has pledged over \$260 million in extra-budgetary funding for IAEA safeguards work, above and beyond our assessed contribution to the regular IAEA budget.
  - Since 2015, this funding has supported initiation of more than 265 new tasks through the USSP, promoting the strengthening of safeguards through direct and in-kind support to the IAEA, including providing more than 65 staff in the form of Junior Professional Officers and Cost-Free Experts and more than 50 training courses and workshops, and supporting the procurement of nearly 25 different safeguards equipment systems. We have also developed and transferred numerous safeguards technologies to international partners, including the IAEA.
  - The USSP has funded information technology (IT) software development and hardware upgrades to assist the IAEA in improving and modernizing their IT systems. These upgrades include modernization of legacy systems as well as the deployment of new solutions.
  - The USSP funded a multi-lab effort to build a prototype of the Unattended Cylinder Verification Station (UCVS). The UCVS is designed to provide measurements of cylinder content enrichment, U-235 mass, and overall uranium mass. UCVS development started in 2015 and a completed prototype was shipped to the IAEA in the Fall 2021. The IAEA will begin in-house testing in 2022.
  - The USSP also provides commercial off-the-shelf solutions to the IAEA, including Next Generation surveillance systems, cameras, electrically cooled gamma radiation detectors, and detectors for unattended monitoring systems.
  - In 2020, the USSP allocated €\$2.5 million to pay for charter flights by IAEA inspectors to carry out essential safeguards activities during the COVID-19 pandemic. The USSP also allocated €800,000 for emergency physical protective equipment to further support the IAEA's Department of Safeguards.

### ***Bilateral and Multilateral Safeguards Capacity Building***

- The United States has engaged over 100 countries to build partners' capacity to implement IAEA safeguards, including best practices and training workshops on Additional Protocol implementation, strengthening State Systems of Accounting for and Control of Nuclear Material, quality management, non-destructive assay, and safeguards regulatory development.
  - The United States typically holds over 50 engagements per year on safeguards implementation for countries in Africa, Europe, the Middle East, Central Asia, East Asia, Southeast Asia, and Latin America and the Caribbean. These engagements focus on the adherence to and effective implementation of Comprehensive Safeguards Agreements, modified SQPs, and APs.

### ***Developing Safeguards Technology, Concepts, and Approaches***

- The United States continues to push the state of the art in safeguards technology development, and concepts and approaches. These activities include:
  - The development and transfer of at least five safeguards technologies per year to the IAEA or partner countries to support the effective and efficient implementation of safeguards agreements; for example: reference standards for the Network of Analytical Laboratories, new methods for surveillance camera image review and equipment for unattended monitoring;
  - The development of safeguards-by-design guidance documents for general classes of fuel cycle facilities;
  - Engagement with stakeholders from the advanced reactor community to evaluate and consider specific safeguards measures that could be included in the design.

### ***Safeguards Education and Training***

- The United States seeks to recruit, educate, train, and retain a new generation of international safeguards specialists for positions in the United States and at the IAEA. This initiative has expanded safeguards education and training opportunities through a variety of mechanisms:
  - Sponsored laboratory internships and graduate and post-graduate research and fellowship opportunities;
  - Published a nuclear safeguards textbook available for free download;
  - Developed and sponsored six annual short courses on safeguards and non-proliferation topics.
- Through the USSP, the United States responds to formal requests from the IAEA for in-kind support in the form of training and support for training. Examples of USSP training support are:
  - Holding training courses at U.S. national laboratories;
  - Sending U.S. subject matter experts to Vienna to support training courses at IAEA headquarters;
  - Performing training needs analyses;
  - Providing travel funds for IAEA staff to attend university and commercially sponsored courses;

- Developing new training tools;
- Providing Cost-Free Experts and Junior Professional Officers to integrate within the IAEA's Safeguards Training Section for three to five years;
- Contributing approximately 13 courses per year to address a wide range of topics from nondestructive assay (NDA) techniques to communications skills. Some courses have a long history; for example, nearly all inspectors who joined the IAEA since 1980 have received instruction on NDA techniques at Los Alamos National Laboratory. Other courses were created more recently to meet the specific needs of the IAEA. For example, in 2017, the USSP supported the development, pilot run, and inaugural offering of the Plutonium Diversion Detection Training Course at Idaho National Laboratory.

## **ii. Export Controls**

- The United States maintains a rigorous and comprehensive system for nuclear export controls and has worked for years to strengthen international nuclear export control regimes and assist states in implementing regime requirements.
- The United States views export controls as an essential tool to facilitate commerce by providing confidence to suppliers that transfers of controlled goods and technology will be used for peaceful purposes only. Effective nuclear export controls do not impede access to legitimate trade; rather they promote international security by helping prevent the proliferation of nuclear weapons consistent with the NPT's obligations.
- The United States is a strong supporter of the multilateral nuclear export control regimes, through its active participation in the Zangger Committee and the Nuclear Suppliers Group (NSG) since their inception.
- The United States continues to work with the 48 NSG Participating Governments to update NSG Guidelines and Control Lists to ensure they remain relevant and effective in the face of evolving trade, technological developments, and proliferation.
- The United States implements its NSG commitments in U.S. export regulations covering nuclear and nuclear-related dual-use material, equipment, and technology.
- The United States reoriented the focus of the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction's (GP's) Chemical, Biological, Radiological, and Nuclear (CBRN) Working Group (WG) to emphasize export controls, hosting six intersessional meetings dedicated to export control issues during its 2020 GP Presidency, including missile export controls, catch-all controls, proliferation financing, and border security. The United Kingdom supports these new priorities and committed to sustaining CBRN WG's focus on export controls during its 2021 GP Presidency.
- The United States also continues to support export control training and assistance programs worldwide. The Department of State's Export Control and Related Border Security (EXBS) Program carries out numerous outreach and capacity-building activities across the globe to prevent the proliferation of weapons of mass destruction and destabilizing accumulations of advanced conventional weapons through improving the strategic trade controls of partner countries. Since the 2015 NPT Review Conference, DOS has completed over 3,180 activities, including:

- Donating approximately \$50 million in state-of-the art detection, inspection, and interdiction equipment to our program partners to enhance their radiation detection and border protection capabilities;
  - Training for more than 8,000 partner country officials in the development of enforcement techniques and capabilities, including mechanisms for targeting, detection, inspection, and disposal of proliferation-relevant cargo, as well as specialized training for border control and enforcement agencies, such as commodity identification and detection and interdiction techniques at air, land, sea, and rail environments;
  - Providing over 400 activities a year, roughly half of which were distance learning engagements, such as legal and regulatory workshops, consultations with subject matter experts, and regional seminars to develop strategic trade control frameworks that conform to international standards for regulating trade and transfer of dual-use goods, military, and WMD-related technologies on the control lists of the multilateral export control regimes. In addition, EXBS provided training for law enforcement officials to establish effective border enforcement measures to combat diversion and illicit trafficking in these items to help partners meet their international commitments, including their obligations under UN Security Council resolution 1540 and UN Security Council sanctions resolutions.
  - Sponsoring several regional and international conferences bringing policymakers and technical experts together to share best practices and to strengthen national strategic trade control systems.
- The Department of Energy (DOE) works with partners globally to improve implementation of export controls to prevent diversion of dual-use goods to nuclear weapons programs or other WMD programs. DOE has engaged over 35 countries annually to help strengthen their export control implementation. In addition, DOE has provided technical support to the World Customs Organization (WCO)'s Strategic Trade Control Enforcement Programme, which provides tools that support customs authorities around the world to take on nonproliferation functions.

### iii. Nuclear Security

Nuclear and radiological terrorism remains a significant threat to global security, requiring a strong and enduring commitment to national action. The United States continues to work with international partners to strengthen their capabilities to protect, recover, and remove dangerous materials, and enhance their capabilities to detect, disrupt, respond to, and investigate nuclear smuggling activities. Such security efforts sustain access to the peaceful uses of nuclear technology by providing assurances that nuclear material is protected.

#### *Multilateral Nuclear Security Efforts*

- The United States works with a host of multilateral organizations and fora to improve nuclear security globally, including but not limited to, engagement with the IAEA, INTERPOL, the Global Initiative to Combat Nuclear Terrorism (GICNT), the UN Security Council Resolution (UNSCR) 1540 Committee, the Global Partnership (in particular the Nuclear and Radioactive Security Sub-Working Group and Nuclear Safety and Security Group), and the Nuclear Security Contact Group (NSCG).
- The United States works closely with the IAEA to enhance Member State nuclear security capabilities. Since 2015, the United States has provided over

\$124 million to the IAEA's Nuclear Security Fund. These U.S. contributions include:

- Cost-Free Experts, Junior Professional Officers, and consultants providing important expertise and support in specific fields in the form of supplemental staff;
  - Advisory services (missions and technical visits) to IAEA Member States to establish the necessary infrastructure to protect nuclear and other radioactive materials from theft and diversion, to protect nuclear installations and transport against sabotage and other malicious acts, and to combat illicit trafficking in nuclear and other radioactive materials;
  - Development of Nuclear Security Series guidance documents and dissemination of concepts and procedures for dealing effectively with nuclear and radiological threats through international conferences, training courses, seminars, and workshops;
  - The IAEA's Incident and Trafficking Database (ITDB), which facilitates the exchange of authoritative information among participating states and selected international organizations on incidents involving illicit trafficking and other unauthorized activities involving nuclear and other radioactive materials;
  - IAEA International Physical Protection Advisory Service (IPPAS) missions in other countries;
  - IAEA assistance to Member States in the development of infrastructure, including equipment, and training for the implementation of nuclear security and emergency preparedness and response at major public events, such as sports or political gatherings;
  - Preparation for the first Review Conference of the Amended Convention on the Physical Protection of Nuclear Material (A/CPPNM);
  - The 2020 International Conference on Nuclear Security (ICONS) convened by the IAEA.
- Since 2015, the United States has provided \$3.6 million in extra-budgetary funding and \$1.2 million in equipment to strengthen the emergency preparedness and response capabilities of the IAEA and Member States.
    - The United States partners with the IAEA to conduct joint training courses on emergency preparedness and response at ports, maritime emergencies, major public events, and on consequence management.
    - The United States provides equipment and technical support to augment national capabilities for responding to emergencies and securing major public events such as the Olympics and World Cup.
    - The United States provides cost-free technical experts to develop and promote international standards, best practices, and policy guidance for preparing for and responding to nuclear and radiological emergencies.
    - The United States chaired the Emergency Preparedness and Response Standards Committee from its inception in 2015 through 2020, leading the committee in its development and implementation of standards to improve Member States emergency preparedness and response capabilities.
  - The United States established the NSCG, a global network of senior-level experts dedicated to sustaining action and ambition on nuclear security,

representing 48 governments and four international organizations. The United States participated in the most recent NSCG meeting held in 2018.

- The United States also leads and supports the implementation of major activities to confront the threat posed by terrorist acquisition of nuclear and other radioactive material, including through the GICNT and bilateral cooperation.
  - The United States continues to co-chair the GICNT, which is a multilateral partnership of 89 partner nations and six official observers committed to strengthening global capacity to prevent, detect, and respond to nuclear terrorism.
    - Since it was launched by Russia and the United States in 2006, the GICNT has held over 100 multilateral activities, in particular across the GICNT's focus areas of nuclear forensics, detection, and emergency preparedness and response, which have brought together technical, operational, and policy experts.
    - These activities have explored key challenges in difficult or emerging areas of nuclear security and have promoted the use of exercises for testing and strengthening national and international responses to nuclear terrorism threats.
- As a complement to the multilateral activities of the GICNT, the United States, through the Department of State, the Department of Energy, and the Federal Bureau of Investigation, diplomatically engages partner nations to build national capacities to counter nuclear and radiological material smuggling and advance the adoption of nuclear security practices at the facility, organization, and national levels.
  - Specifically, bilateral activities focus on increasing capabilities to respond to, investigate, and prosecute incidents of nuclear or radiological material smuggling, including by enhancing national nuclear forensics expertise and by instituting human reliability vetting and monitoring.

### ***Bilateral Nuclear Security Efforts***

- The United States is committed to continuing its leadership on this vitally important issue through its bilateral engagements worldwide to advance nuclear security.
- U.S. bilateral civil nuclear cooperation agreements require a guarantee that nuclear material transferred pursuant to the agreement or used in or produced through nuclear material or equipment so transferred is subject to adequate physical security. To ensure that physical protection measures over U.S.-obligated nuclear materials are comparable to the recommendations in IAEA publication INFCIRC/225, the United States has conducted over 200 bilateral assessment visits to 51 countries since 1974.
- To strengthen nuclear security, the United States has engaged bilaterally in the following programmatic activities:
  - Assisted 48 countries and Taiwan to remove or confirm the disposition of over seven MT of vulnerable HEU and plutonium. Thirty-three countries and Taiwan have become HEU-free (defined as less than 1 kg of HEU remaining) through these efforts;
  - Assisted with the downblending of 16.8 MT of civil HEU and helped reduce the numbers of buildings and sites with weapons-usable nuclear materials;

- Successfully converted 13 research reactors and medical isotope production facilities in nine countries to LEU fuel use or verified those reactors as shut down;
- Conducted bilateral outreach in support of universalization of the Amendment to the Convention on the Physical Protection of Nuclear Material (A/CPPNM), which now has 126 States Parties plus EURATOM (the CPPNM has 163 States Parties plus EURATOM);
- Additionally, the United States has conducted bilateral outreach in support of universalization of the International Convention for the Suppression of Acts of Nuclear Terrorism, which now has 118 Parties.
- Supported the commitment of 140 countries to follow the Code of Conduct on the Safety and Security of Radioactive Sources. Additionally, 123 countries have expressed their commitment to the Supplementary Guidance on the Import and Export of Radioactive Sources, and 44 countries have expressed their commitment to the Supplementary Guidance on the Management of Disused Radioactive Sources (44 countries).
  - Since the beginning of FY 2015 to the end of FY 2020 helped secure 550 buildings with high-priority radioactive materials for a cumulative total of 2,361 buildings secured;
  - Since the beginning of FY 2015 to the end of FY 2020 equipped over 130 fixed international points of entry with radiation detection systems and provided over 125 mobile radiation detection systems to partner countries to combat illicit trafficking in nuclear and radioactive material for a total of \$75.9 million.
- Taken steps to build national capabilities to counter nuclear smuggling, including increased law enforcement and intelligence efforts to investigate nuclear smuggling networks, increased use of radiation detection systems both at and inside national borders, and increased nuclear forensics capabilities and legal training in twenty countries to help secure conviction of criminals arrested for smuggling these dangerous materials;
- Conducted workshops in various countries on the physical protection of nuclear facilities and of radioactive materials with an emphasis on establishing and maintaining an effective, sustainable security regulatory infrastructure;
- Helped secure 550 civilian buildings containing high-priority at-risk radioactive materials in 57 countries since 2015 and helped secure approximately 2,361 buildings containing vulnerable, high-activity radioactive sources in more than 100 countries since this cooperation was initiated;
- Negotiated bilateral Joint Action Plans with 14 partner countries outlining priority steps that we will jointly take to prevent, detect, and respond to nuclear and radioactive materials smuggling activities;
- Cooperated to procure more than 300 vehicles and railcars for secure transportation of nuclear material in the United States and develop an automated transportation security system to ensure security of nuclear material shipments;
- Provided 28 countries with radiation detection equipment on long-term loan to aid in responding to emergencies and securing major public events;



- Provided international training on insider threat mitigation and human reliability programs, to address the risk that a malicious insider could divert nuclear material, technology, or expertise;
- Working with international partners, jointly designed, completed, or upgraded several training centers to expand nuclear security training capabilities in partner countries, including the International Network for Nuclear Security Support Centres (NSSC);
- Engaged bilaterally with 34 countries and international organizations on technical nuclear forensics best practices. In particular, the United States has provided partner countries with training and capacity building support to promote nuclear forensics expertise necessary to prosecute crimes related to the trafficking of radioactive/nuclear material. The United States has cooperated extensively with the IAEA on training and development of implementing guides on nuclear forensics methodologies.
- In 2012, hosted the first International Regulators Conference on Nuclear Security. This conference, which was attended by nearly 500 participants from over 30 countries, enhanced dialogue between security regulators worldwide. Since 2012, the U.S. Nuclear Regulatory Commission (NRC) has provided significant support to counterparts in Spain and Morocco, as they held the second and third iterations of the conference in 2016 and 2019, respectively.
- Through the U.S. Defense Threat Reduction Agency (DTRA), spending approximately \$7 million annually on the U.S. International Counterproliferation Program, building partner capacity to counter proliferation in more than 30 countries and complementing other USG efforts to counter weapons of mass destruction. DTRA's Cooperative Threat Reduction (CTR) Global Nuclear Security (GNS) Program prevents the proliferation of nuclear weapons and materials by facilitating the cooperative elimination of foreign nuclear weapons and components, supporting the safe and secure transportation and storage of nuclear and high-threat radiological materials, and improving safety and security practices at foreign partner nuclear facilities. From 2015 to present, GNS spent approximately \$220 million to execute activities such as:
  - Developing and implementing 15 counter nuclear smuggling training courses into the curriculum at Ukraine's George Kuzmych Training Center; completed renovations for the operational and tactical training grounds;
  - Implementing physical security upgrades and site surveys at the Semipalatinsk Test Site in Kazakhstan; delivered 13 nuclear security courses and completed renovations to the Kazakhstan National Guard Anti-Crisis Training Center;
  - Partnering with the United Nations Interregional Crime and Justice Research Institute (UNICRI) and the countries of Ukraine, Georgia, and Moldova to improve regional capabilities of state security and law enforcement officials to devise, plan and carry out information sharing operations to thwart radiological and/or nuclear trafficking attempts;
  - Completing multi-modal military transportation certifications and a proof of concept, shipboard deployment exercise, of the Department of Energy's Mobile Uranium Facility and Mobile Plutonium Facility to enable rapid deployment should the need arise to recover weapons-usable nuclear material on short notice.

**iv. Nuclear-Weapon-Free Zones**

- The United States has supported the establishment of nuclear-weapon-free zones (NWFZs) that are developed in accordance with the 1999 principles and guidelines adopted by the United Nations Disarmament Commission and can be effectively verified. We evaluate such zones on a case-by-case basis.
- The United States has signed and ratified the two protocols to the Treaty of Tlatelolco, which established a NWFZ that covers Latin America and the Caribbean. The United States has also signed the relevant protocols to the Treaties of Pelindaba (Africa), Rarotonga (South Pacific), and Semipalatinsk (Central Asia) and is working to advance their ratification.
- The United States remains committed to the long-term goal of a Middle East free of all WMD and their delivery systems alongside a comprehensive and durable regional peace and continues to support efforts to promote direct, inclusive, and consensus-based dialogue on the basis of arrangements freely arrived at by all the regional states. The United States believes the most productive way to achieve meaningful progress would be for regional states to explore practical steps and confidence-building measures that could build trust and address regional political and security barriers that continue to impede progress on such a zone.

**v. Compliance and Other Related Issues/Concerns**

- The United States is committed to holding Iran to its NPT and related nuclear safeguards obligations; Iran having a nuclear weapon would be unacceptable. The United States is committed to ensuring that Iran never acquires a nuclear weapon and is currently seeking a mutual return to JCPOA compliance as a foundation for efforts to address broader concerns related to Iran's ballistic missile-related activities and its other destabilizing activities in the region.
- We strongly support the IAEA's full verification of Iran's NPT-required comprehensive safeguards agreement and its Joint Comprehensive Plan of Action (JCPOA) nuclear-related commitments. We continue to urge Iran to fully cooperate with the IAEA without delay in providing the information and access necessary to resolve IAEA questions related to four undeclared locations in Iran, including three where the IAEA has detected the presence of nuclear material. These unresolved safeguards issues relate to Iran's legal obligations under its NPT-required safeguards agreement and raise serious questions regarding Iran's compliance with these obligations. We also call upon Iran to implement the provisions of its Additional Protocol with the IAEA, which Iran announced in February 2021 it would stop implementing.
- The United States is committed to the complete denuclearization of the Korean Peninsula and harbors no hostile intent toward the Democratic People's Republic of Korea (DPRK). U.S. policy calls for a calibrated, practical approach that is open to and will explore diplomacy with the DPRK to make tangible progress that increases the security of the United States, our allies, and our deployed forces. We continue to urge the DPRK to halt provocations, return to the NPT and IAEA safeguards, abide by its obligations under the UNSCRs relating to the DPRK, and engage in sustained and intensive negotiations with the United States. We also urge all UN Member States to fulfill their obligations fully and completely under the DPRK UNSCRs, which are focused on denying the DPRK the resources it needs to advance its unlawful WMD and ballistic missile programs.

- The United States joined other NPT Parties in co-sponsoring joint statements on addressing the DPRK nuclear challenge at the 2017, 2018, and 2019 PrepCom meetings for the Tenth NPT Review Conference. The 2019 statement had 70 cosponsors.
- The United States continues to hold Syria accountable for noncompliance with its NPT-required IAEA safeguards agreement, and with its safeguards obligations under the NPT itself, and calls on Syria to take the necessary steps to meet its non-proliferation obligations and cooperate fully with IAEA requests for access to all relevant locations, materials, and persons. The United States, joined by 51 other NPT Parties, sponsored a joint statement on Syria's safeguards and NPT noncompliance at the 2019 meeting of the NPT PrepCom.

**vi. United Nations Security Council Resolution 1540**

- The United States continues to support the work of the Committee established pursuant to United Nations Security Council resolution (UNSCR) 1540 to foster its full implementation. This includes legally binding obligations on all States to implement the resolution's non-proliferation provisions, including accounting for and securing WMD-related materials, and developing and maintaining border and export controls on such items and related technology. For example:
- Nationally, the United States has taken measures to implement its UNSCR 1540 obligations. The United States in 2020 provided the 1540 Committee with a report on these efforts, including measures related to nuclear non-proliferation, and in 2014 submitted to the Committee a set of national effective practices, including those practices designed to combat nuclear proliferation. The U.S. 1540 "matrix" of compliance data was most recently posted to the 1540 Committee's website at the end of 2020 and delineates these practices in detail, as will reports by the Committee's Group of Experts to be submitted by early 2022 as part of the resolution's comprehensive review, now scheduled to take place by the middle of 2022.
- Internationally, the United States supports the full range of Committee efforts to engage all 193 UN Member States and cooperate with nearly 50 international or regional organizations on implementing all aspects of the resolution. Contributions to the UN Trust Fund for Global and Regional Disarmament Affairs have supported the creation of 1540 Regional Coordinator positions in Africa and Asia, adding to the cadre of coordinators sponsored by Canada and the EU in the OAS and OSCE regions. These and related contributions that will support 1540 Point of Contact trainings in Africa and Asia are in addition to on-going expenditures of hundreds of millions of dollars of 1540-related international assistance efforts undertaken by the U.S. Department of State and several other U.S. trade and national security agencies.
- Contributions from the United States (initial funding in 2011 and 2012 totaling \$4.5 million and another \$1.5 million in 2021) and 11 other funders of the Trust Fund have helped the UN Office for Disarmament Affairs support activities that promote full implementation of states' UNSCR 1540 non-proliferation obligations and universal adherence to key nuclear non-proliferation agreements. In addition, the United States supports regular consultations between the 1540 Committee and the IAEA, the inclusion of nuclear non-proliferation topics in its country-specific dialogues, and participation by the Committee in international and regional nuclear non-proliferation activities, such as successive ASEAN Regional Forum events with a focus on UNSCR 1540-related nuclear non-proliferation topics, including nuclear security.

### **Section III: Reporting on National Measures Relating to the Peaceful Uses of Nuclear Energy**

#### **i. Promoting Peaceful Uses**

- The United States is dedicated to international cooperation on the uses of nuclear energy for peaceful purposes, consistent with Article IV of the NPT. Nuclear safety and security standards expand the use of nuclear energy for peaceful purposes by ensuring quality implementation and generating international cooperation. The United States fulfills its NPT Article IV obligations in a variety of ways, including through bilateral nuclear trade and technical assistance and through contributions to the IAEA's Technical Cooperation Fund and Peaceful Uses Initiative.
- The United States contributed funds to enable a series of regional meetings in 2020 and 2021 in partnership with the NPT Review Conference President-designate to identify opportunities for sustained enhancement of peaceful nuclear cooperation under the framework of the NPT.
- The United States supports the production of medical isotopes without the use of HEU. In 2018, using an HEU-free neutron capture technology, the United States began its first domestic production of Mo-99 since 1989.
- The United States initiated a new program in 2020 called PRO-X (Proliferation Resistance Optimization) to minimize special nuclear material production in new research reactors while optimizing reactor performance.

#### ***Nuclear Trade and Technical Assistance***

- The United States supports the safe use of peaceful nuclear technology abroad through licensing transfers of nuclear material, equipment, technology, and assistance.
- Since 2015, the United States has completed over 400 licensing and authorization actions supporting exports of nuclear material, equipment, technology, and transfers of assistance benefitting at least 60 countries.
- To facilitate peaceful nuclear trade and to improve security, the United States has worked to streamline the licensing process for nuclear material, equipment, technology, and assistance transfers.

#### ***Bilateral and Multilateral Cooperation***

- The United States has in place 23 bilateral agreements pursuant to Section 123 of the U.S. Atomic Energy Act (123 Agreements) that establish the legal framework for significant civil nuclear cooperation with 49 partners.
- To support the safe and secure use of peaceful nuclear applications, the Department of Energy has 20 bilateral cooperative arrangements. The NRC has more than 50 bilateral arrangements for the exchange of technical information and cooperation. More partnerships are being formed.
- The United States considers the combination of a Comprehensive Safeguards Agreements (CSA) coupled with the Additional Protocol (AP) to be the de facto international standard for safeguards and actively encourages all suppliers and recipients to make the CSA and AP a condition for nuclear exports.
- In 2011, the United States announced the availability the American Assured Fuel Supply (AAFS), a reserve of approximately 230 MT of LEU derived from down-blending 17.4 MT of HEU declared excess to defense needs to serve as backup

fuel supply. The AAFS is available to domestic recipients or to any U.S. peaceful nuclear cooperation partner through a U.S. supplier, in the event their need cannot be met by the commercial market due to a severe or unanticipated disruption.

- The United States contributed nearly \$50 million to the IAEA to support establishment of the IAEA Low Enriched Uranium Bank in Kazakhstan to assure Member States of a reliable supply of fuel for peaceful nuclear reactors. The IAEA's LEU Bank became operational in 2019. At that time a total of €73 million in aggregate donor funds remained, of which €32 million remained from the U.S. contribution. While €6 million of the remaining U.S. funds will be utilized for operational support of the LEU Bank, the United States has reallocated the rest of these funds to other priority IAEA activities, such as peaceful uses, safeguards, and security. As another example of the U.S. commitment to expanded access to the peaceful uses of nuclear energy, €10 million is being reallocated to IAEA peaceful uses activities, including activities under the Programme of Action for Cancer Therapy and technical cooperation projects managed by the African Regional Cooperative Agreement for Research, Development, and Training related to Nuclear Science and Technology (AFRA) and the Regional Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL). In addition, €16 million is being reallocated to activities related to safeguards and nuclear and radiological security.
- In 2019, the United States introduced a new diplomatic initiative, the Nuclear Cooperation Memorandum of Understanding (NCMOU). These are diplomatic instruments that establish the basis for broader, strategic relationships between the U.S. Government and its foreign counterparts, develop stronger ties between the United States and partner countries' nuclear experts, industry, and researchers, and provide high-level support for the U.S. civil nuclear industry and nuclear non-proliferation goals. The United States has signed five NCMOUs – with Bulgaria, Ghana, Poland, Romania, and Slovenia.

### ***Capacity Building***

- The Department of State's Partnership for Nuclear Threat Reduction (PNTR) seeks to promote a self-sufficient nuclear security culture ingrained in partner countries' nuclear technical organizations. Through 2021, PNTR engaged 18 partner countries around the world, and it continues to work with select states that are considering or managing nuclear research facilities and power plants. To do so, PNTR has:
  - Helped partner institutions to develop and sustain trustworthiness programs (i.e., human reliability programs, fitness-for-duty, etc.) to mitigate potential insider threats at nuclear facilities;
  - Provided training for nuclear technical experts to promote and demonstrate security culture as a vital component of nuclear applications and operations;
  - Empowered partners to institutionalize nuclear security trainings through train-the-trainer initiatives, including professional development courses and academic curriculum development.
- The Department of State provides capacity-building support consistent with the IAEA Milestones Approach to nuclear energy newcomer countries and other states that may consider the deployment of a novel reactor under the Foundational Infrastructure for Responsible Use of Small Modular Reactor Technology (FIRST) program, a Presidential initiative announced by the White House at the

Leaders' Climate Summit in April 2021. This program provides partner countries with capacity-building in nuclear security and safety, regulatory development, workforce development, stakeholder engagement, small modular reactor (SMR) technology selection, siting, and financing, and related topics to support the deployment of SMRs and other advanced reactors in a manner that promotes the highest standard of nuclear nonproliferation, security, and safety.

- The Department of Energy works with more than 100 countries to promote the effective and efficient implementation of safeguards agreements, cooperating with many low- and medium-income countries to promote regulatory effectiveness, including to enhance access to and oversight of peaceful uses projects and programs.
- Through the IAEA, the International Framework for Nuclear Energy Cooperation, and bilaterally, the United States supports the efforts of countries considering nuclear power to build the national infrastructure needed to pursue the highest standards for safety, security, and non-proliferation.
- Recognizing the importance of a robust and independent regulatory authority, the NRC has contributed significant financial and in-kind support to assist partner countries with regulatory capacity building for existing, expanded, or new nuclear and radioactive sources material oversight programs. Utilizing bilateral and multilateral approaches, the NRC has provided critical capacity building support for nuclear safety and security to over 130 countries. This support includes, on average, more than 250 bilateral or multilateral technical exchanges each year, including virtual exchanges during the COVID-19 pandemic.
- The United States fully supports the IAEA's efforts to fund and execute renovations of its Nuclear Applications Laboratories to build critical capacities far into the future in peaceful uses areas that include health, agricultural productivity, food safety, and the environment. Since 2015, the United States has provided over \$25 million to this project and has worked with IAEA Member States to raise additional funds to complete the renovations.

## ii. Technical Assistance through the IAEA to its Member States

### *Technical Cooperation Program and Peaceful Uses Initiative*

- Since 2015, the United States has provided more than \$200 million to the IAEA to support technical cooperation and promotional programs. This figure includes:
  - More than \$165 million in voluntary contributions to support the IAEA Technical Cooperation Fund (TCF). Technical cooperation (TC) projects are having a positive humanitarian impact in the developing countries of Africa, Latin America, Asia, and Eastern Europe in the fields of human health, agriculture and food security, isotope hydrology and water management, the environment and climate change, and nuclear energy infrastructure and sustainability. The U.S. TCF contribution, consistently furnished for decades, supports on a collective basis the same kinds of projects supported individually by U.S. contributions to the IAEA's Peaceful Uses Initiative (PUI), as described below.
  - More than \$27 million in voluntary contributions to support IAEA technical cooperation above and beyond projects funded through the TCF. This covers in-kind and monetary support towards training, technical expertise, fellowships, and Cost-Free Experts. For example, in 2021, over 1,700 U.S. experts, of which about 93% attended remotely, participated in over 700 IAEA events (such as technical meetings, workshops/training courses, expert missions, and international conferences and symposiums). Five

virtual IAEA training courses were hosted by Argonne National Laboratory, attended by 138 participants from 54 countries to learn about peaceful uses topics through live and pre-recorded lectures from over 36 U.S. speakers of 16 institutions, interactive discussions, and case study assignments. Three IAEA fellows, representing three countries, were placed and completed training in various areas of peaceful uses at three U.S. host institutions.

- The United States contributed more than \$50 million in voluntary contributions to the IAEA PUI between 2015 and 2020. Contributions by the United States and other international donors have provided the IAEA with additional flexibility and resources to support high priority IAEA Member State projects and to respond to unforeseen challenges, sometimes on short notice. In 2020, the United States pledged an additional \$50 million for the next five years (2021-2025). More than 150 IAEA Member States have benefitted from the PUI through over 296 completed and ongoing projects. Individually or partnering with other PUI donors, the United States has contributed through the PUI financial support to IAEA technical assistance activities which include:
  - Implementing methods to determine and trace oil and plastic pollution in marine waters;
  - Building capacity to detect, quantify, and reduce the adverse impacts of harmful algal toxins on seafood safety in countries throughout the world;
  - Continued support of the Ocean Acidification International Coordination Center at the IAEA Environment Laboratories in Monaco to promote global actions against ocean acidification;
  - Continued development of a sustainable zone free of the tsetse fly in the Niayes region of Senegal to relieve the burden of trypanosomiasis and increase food and agricultural productivity;
  - Improvement of veterinary laboratory capacities in Asia and continued support for laboratories in Sub-Saharan Africa for rapid and specific diagnosis of transboundary zoonotic diseases;
  - Enhancement of laboratory capacity in worldwide to ensure food safety and reduce the threat that pests and pollution pose to agriculture resources;
  - Strengthening food security worldwide by increasing crop production and soil fertility using nuclear techniques;
  - Assessment and strengthening of national capabilities to detect and treat cancer, including radiotherapy treatment capacity, in more than 30 countries around the world;
  - Advancement of education and training in nuclear medicine, as well as application of nuclear techniques to improve the treatment of cardiac and cancer patients;
  - Developing multidisciplinary management of cervical cancer treatment to support women's health;
  - Implementation of the sterile insect technique to control mosquitoes that are vectors for the Zika virus;
  - Enhancement of national capabilities to respond to nuclear and radiological emergencies in Africa;

- Study of the possible impact of radioactive releases following the Fukushima Daiichi Nuclear Power Plant accident;
- Improvement of the control of radioactive sources in Africa and the Mediterranean region;
- Strengthening of biological dosimetry in the Asia and Pacific region;
- Promotion of the sustainable development of uranium resources in Africa;
- Development of nuclear power infrastructure, including capacity building of human resources and legal and regulatory framework, in numerous countries throughout the world;
- The provision of COVID-19 diagnostic testing kits for the IAEA's largest TC project to date.

### **iii. Nuclear Safety & Civil Nuclear Liability**

- The NRC has concluded more than 40 bilateral arrangements for the exchange of technical information and cooperation.
- In early 2015, the United States and other Parties to the Convention on Nuclear Safety (CNS) adopted the Vienna Declaration on Nuclear Safety, confirming their commitment to the legal obligations under the CNS and implementing safety principles and lessons learned arising from the 2011 Great Tohoku earthquake, tsunami, and Fukushima Daiichi Nuclear Power Plant accident.
- The United States has participated extensively on nuclear safety issues within the IAEA and other international venues, including the IAEA's Commission on Safety Standards and its subcommittees.
- The United States has actively promoted the Convention on Supplementary Compensation for Nuclear Damage (CSC) to be a global nuclear liability regime and urged other countries to become parties. The CSC entered into force on April 15, 2015.
- The United States works closely with the G7 and European Commission to support Ukraine in returning the damaged Chornobyl Unit 4 reactor site to an environmentally safe and stable condition. As the largest bilateral donor to the European Bank for Reconstruction and Development Chornobyl Shelter Fund, the United States seeks to put this legacy issue to rest.
- To promote nuclear safety in over 60 IAEA Member States and at the regional level across the globe, the United States has made regular extra-budgetary contributions to the IAEA for nuclear safety, including for the Nuclear Safety Action Plan.
- The United States continues to contribute funding and personnel to assist the Asian Nuclear Safety Network, the Forum of Nuclear Regulatory Bodies in Africa, the Ibero-American Forum of Radiological and Nuclear Regulatory Agencies, and the Arab Network of Nuclear Regulators to build sustainable nuclear safety infrastructure and capabilities in countries pursuing domestic civil nuclear power programs.