

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

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National report pursuant to actions 5, 20 and 21 of the final document of the 2010 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons: 2015–2022

Report submitted by France

Introduction

The aim of this report is to provide information on the efforts of France in the area of non-proliferation and disarmament, and on measures taken to implement its obligations under the Treaty on the Non-Proliferation of Nuclear Weapons. The non-proliferation regime is the backbone of our collective security system, and the Treaty is its cornerstone. We celebrated the fiftieth anniversary of the Treaty's entry into force in 2020. The Treaty requires of us, more than ever, a spirit of responsibility and our mobilization. Preserving and strengthening the solidity, credibility and sustainability of the non-proliferation and disarmament regime for future generations is an objective that must bring the entire international community together. France is committed to participating fully in the achievement of this objective.

This report reflects the priorities that France will be keen to uphold during the tenth Review Conference. France will strive to ensure the reaffirmation of the primacy and centrality of the Treaty, which must be protected and not challenged, through a balanced approach across its three pillars:

- (i) Continuing to promote progressive disarmament on the basis of the principle of undiminished security for all, as per article VI of the Non-Proliferation Treaty and Security Council resolution [1887 \(2009\)](#). This realistic approach to disarmament, involving the strengthening of international stability and security, is the only way to achieve concrete progress in the area of disarmament. Therefore, French deterrence is strictly defensive and is based on the principle of strict sufficiency. As the President of the Republic recalled in his speech at the École de Guerre on 7 February 2020, the doctrine of France promotes transparency and the maintenance of its nuclear arsenal at the lowest possible level compatible with the strategic circumstances. That arsenal today comprises less than 300 nuclear weapons;



- (ii) Stressing emphatically the full commitment of France, as a responsible nuclear-weapon State, to its security assurances and to all of the commitments it has made under the Non-Proliferation Treaty;
- (iii) Mobilizing the international community in respect of the serious risks of destabilization generated by the continuation of proliferation activities by certain States;
- (iv) Promoting the unique contribution of the Non-Proliferation Treaty in terms of peaceful uses of nuclear technology, not only with regard to nuclear energy and its key role in energy transitions, but also in areas such as health, combating pandemics, and the protection of cultural heritage.

Methodology

As indicated in the action plan adopted at the 2010 Review Conference, the Governments of the five nuclear-weapon States recognized by the Treaty (P5) are working to implement action 5 and draft their national reports in order to “further enhance transparency and increase mutual confidence”. In action 21 of the action plan, it is stated that: “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.” Therefore, France and its P5 partners share the same national reporting framework. It includes categories of themes grouping together relevant information across the three pillars of the Non-Proliferation Treaty: disarmament, non-proliferation and the peaceful uses of nuclear energy. We encourage all States parties to submit similar reports, in keeping with action 20.

In order to foster dialogue ahead of the upcoming Review Conference, France used a new methodology. A draft version of this document was first shared with a wide audience of States and civil society representatives, in order to gather their comments and suggestions for improvement. This feedback took the form of written comments and verbal exchanges at the Transparency Seminar held jointly by France and the Foundation for Strategic Research in Geneva on 4 February 2020, in which government and civil society representatives participated. That consultation process was an integral part of the process of drafting this document, as this final version includes new and updated elements reflecting the discussions.

As the tenth Review Conference was postponed to August 2022, the final version of this report was prepared between 2020 and 2021, and then updated in July 2022, so that it could include the latest developments and figures.

Section I: National disarmament measures

France, in pursuit of peace, is fully committed to disarmament in accordance with the objectives of the Treaty. As stated in article VI of the Treaty, States parties have undertaken to pursue negotiations in good faith on effective measures relating to nuclear disarmament and on a treaty on general and complete disarmament under strict and effective international control. France considers that the goal of nuclear disarmament cannot be separated from the goal of collective security. Nuclear disarmament can move forward only if the strategic context is taken into account, and should be viewed as part of a gradual process that will guarantee undiminished security for all and, beyond that, global stability and security. France is not involved in an arms race, and it spares no effort to

prevent such a race and to improve strategic stability. French deterrence is based on the principle of strict sufficiency and is strictly defensive. France firmly condemns any recourse to nuclear rhetoric that is motivated by aggression, intimidation or coercion. It reiterates its determination to adhere to its commitments, in particular to the Joint Leaders' Statement on Preventing Nuclear War and Avoiding Arms Races of 3 January 2022.

Actions are what matter most. In that regard, France has taken very significant unilateral measures and made ambitious proposals for the determined pursuit of nuclear disarmament at the international level. France considers that this unique track record gives it the legitimacy to call upon the other nuclear-weapon States to take concrete actions towards complete, progressive, credible and verifiable disarmament.

i. National security policies, doctrine and activities associated with nuclear weapons

The French doctrine is presented publicly on a regular basis. Its basic tenets may be found, specifically, in the speeches of the President of the French Republic, the most recent of which was delivered in Paris on 7 February 2020; in the white papers on national defence and security, the latest of which was made public in 2013; and in the strategic review of defence and national security, the latest issue of which was published in 2017 and updated in January 2021 (strategic update).

These communications reaffirm the validity and principles of nuclear deterrence as understood by France, and help build confidence. Regular public communications such as these are necessary to reaffirm the coherence and consistency of the national nuclear deterrence doctrine over time. The reiteration of these previously stated principles is valuable, as it creates predictability and therefore improves stability.

The role of nuclear weapons in French defence and security doctrine is to **“protect France and the French people from any threat of State origin against our vital interests, wherever it comes from and whatever form it takes”,¹ in extreme circumstances of self-defence.** The independent nuclear deterrence of France is also aimed at permanently guaranteeing the country's decision-making autonomy and freedom of action within the framework of its international responsibilities, including against any attempts at blackmail that may be made in the event of a crisis. Nuclear deterrence thus constitutes the ultimate guarantee of the nation's security, sovereignty and independence.

The fundamental principles of French nuclear deterrence are:

(a) **Political control of nuclear weapons.** France emphasizes the political dimension of nuclear weapons. The President of the Republic has the ultimate responsibility for the use of such weapons. The President is solely responsible for determining the alert level of the nuclear forces and for their potential engagement. The control of those forces is therefore strictly political and circumscribed by legal procedures.

(b) **Nuclear weapons: designed to deter, not to be used.** In the French doctrine of deterrence, nuclear weapons are not battlefield weapons but a means of deterring a potential adversary from attacking vital national interests, protecting our freedom of action and enabling us to take our own decisions in all circumstances. For deterrence to work, the circumstances under which nuclear weapons would be used are not, and should not be, precisely defined, so as not to enable a potential aggressor to calculate the risk inherent in a potential attack.

¹ Speech by the President of the Republic delivered on 7 February 2020.

(c) **Strictly defensive nuclear deterrence.** France does not threaten any State, and its deterrence is not targeted. France has reiterated that on many occasions. Potential adversaries must, however, be aware that if they “should underestimate the visceral attachment of France to its freedom and consider attacking our vital interests, whatever they may be”,² our nuclear forces would be capable “of inflicting absolutely unacceptable damage on its centres of power, that is to say, on its critical, political, economic and military centres”.³

(d) **Use only in extreme circumstances of self-defence.** The nuclear doctrine of France is clearly governed by the right enshrined in Article 51 of the Charter of the United Nations.

(e) **Sole, one-time-only nuclear warning.** Should there be any doubt as to the determination of France to protect its vital interests, “a sole, one-time-only nuclear warning” could be given to the aggressor in order to clearly demonstrate that the nature of the conflict has changed, and thus re-establish deterrence.

(f) **Application of the principle of strict sufficiency.** France adjusts the level and characteristics of its arsenal to the strategic context and the minimum level needed to ensure its security. The strict sufficiency threshold is determined through a national analysis of the strategic context and is not directly related to the nuclear capabilities of other States.

(g) **Security assurances.** The security assurances provided by France to all non-nuclear-weapon States that are parties to the Non-Proliferation Treaty and comply with their international non-proliferation obligations are regularly reaffirmed. These security assurances are derived from:

- The French doctrine of deterrence, inasmuch as it unambiguously and consistently sets out the strictly defensive role of deterrence.
- The statement made on 6 April 1995, whereby France reaffirmed, to all non-nuclear-weapon States parties to the Non-Proliferation Treaty, the security assurances it had given in 1982. The Security Council took note of that statement in its resolution [984 \(1995\)](#) and recalled it in its resolutions [1887 \(2009\)](#) and [2310 \(2016\)](#). France considers this commitment legally binding and therefore considers itself fully bound by it and intends to apply it in good faith.
- The signing of the protocols to the treaties establishing nuclear-weapon-free zones, which cover more than one hundred States (see section II).

These commitments do not affect the right to self-defence as enshrined in Article 51 of the Charter of the United Nations.

ii. Nuclear weapons, arms control, nuclear disarmament and verification

France attaches great importance to disarmament, as demonstrated by its actions and tangible achievements, France dedicates considerable human and financial efforts to disarmament. Some decisions taken many years ago, such as the decisions to abandon the country’s land-based nuclear component and dismantle its nuclear test sites and the fissile material production facilities necessary for the production of weapons, require sustained implementation efforts over several decades and several billion euros in investments.

² Ibid.

³ Ibid.

The track record of France in this regard is exemplary:

A) Status and reduction of nuclear arsenals and forces

1) Reduction of the size of French deterrent forces

(a) In keeping with the principle of strict sufficiency, France maintains its arsenal at the lowest level possible in the light of the strategic context and the foreseeable evolution of the threat. French nuclear forces are currently divided into two complementary components:

- **Seaborne component.** Four nuclear-powered ballistic missile submarines, based at Île Longue and equipped with M51 intercontinental ballistic missiles, provide continuous at-sea deterrence.
- **Airborne component.** This comprises Rafale aircraft carrying improved medium-range air-to-surface missiles that could be operated from French soil by the air and space force or, depending on the circumstances, from the *Charles de Gaulle* aircraft carrier by the navy.

The President of the Republic has decided to renovate these two components, which will allow the permanence, credibility and strict sufficiency of the French nuclear deterrent forces to be maintained.

As stated by the President on 7 February 2020, France has **a total of fewer than 300 nuclear warheads**. It has **no weapons in reserve**.

(b) This figure reflects a very significant decrease in the size of French forces, as a result of changes in the strategic context. France has cut its arsenal in half in around 15 years.

France gradually acquired three nuclear components during the Cold War. Since then, in view of the changing strategic context, France has reduced its nuclear arsenal as follows:

- **A one-third reduction in the seaborne component.** The number of nuclear-powered ballistic missile submarines in the seaborne component was cut from six to four in the 1990s.

France has begun dismantling its M4 nuclear-powered ballistic missile submarines. The submarine *Le Redoutable* has been open to the public at the Cité de la Mer in Cherbourg since May 2002. A series of complex operations was carried out beforehand under optimum nuclear safety and security conditions. The remaining M4 nuclear-powered ballistic missile submarines will follow the normal cycle leading to their total elimination.

- **Major reduction of the airborne component.**

- In 2008, France announced its decision to **reduce its airborne component by a third**. That reduction **was completed in 2013**. The mission is currently being conducted by two Rafale squadrons of the strategic air forces and the Rafale of the nuclear naval aviation force, on board the *Charles de Gaulle* aircraft carrier.

- **Elimination of the surface-to-surface component.**

In 1991, France announced several decisions aimed at reducing its surface-to-surface component: early withdrawal of Pluton short-range missiles (completed in 1993); scaling-down of the Hadès missile programme (intended to replace the Pluton missiles) from 120 to 30 units; and elimination of the S45 surface-to-surface missile programme, which were to replace the S3D missiles at the Plateau d'Albion). The Hadès missile programme was terminated in 1992. by

1997, the dismantling of the 30 Hadès missiles that had been produced was completed. **As a result, the land component was eliminated.**

In 1996, the strategic surface-to-surface component was abandoned in turn, as France announced the final withdrawal and dismantling of the Plateau d'Albion surface-to-surface systems. Two years later, in 1998, the dismantling of all S3D missiles was completed. **Thus, France is the only State that has had a surface-to-surface nuclear force and subsequently completely dismantled it.**

(c) In the interests of transparency, France announced as early as 2015 that it possessed three sets of 16 missiles carried by nuclear-powered ballistic missile submarines and 54 improved medium-range air-to-surface delivery systems.

2) Reduction of alert levels

The reduction of the size of the nuclear forces was accompanied by an equally significant reduction in the alert levels. France reduced the permanent alert level of its nuclear forces twice, in 1992 and 1996. These reductions were in both the response times of forces and the number of weapons systems on alert.

Specifically:

- Since 1996, France has kept only one nuclear-powered ballistic missile submarine permanently at sea.
- In 1997, France announced that all of its nuclear forces had been de-targeted. Since then, France has consistently reaffirmed that “our nuclear forces are not directed against any country”.⁴

Strict procedures have been put in place to ensure that no weapons can be used without an order from the President of the Republic. Because they are highly sensitive, the level of transparency with regard to these procedures is necessarily limited.

B) Activities relating to the discontinuation of the production of fissile material for the manufacture of weapons, and efforts to promote a treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices (fissile material cut-off treaty)

1) Moratorium on the production of fissile material for weapons

France stopped producing fissile material to support its nuclear weapons programmes in 1992 (plutonium) and 1996 (highly enriched uranium). It announced a moratorium on the production of such material in 1996.

2) Dismantling of the former fissile material production facilities for weapons

France strongly believes that ending the production of fissile materials for weapons is an indispensable step towards nuclear disarmament.

In 1996, France undertook the **dismantling of its production units** in Marcoule and Pierrelatte, in the south of the country. France intended the decommissioning to be complete and irreversible. The decommissioning operations represent a considerable long-term financial investment. The total cost will be **€12 billion, of which €4 billion have already been spent**. The dismantling process reached an irreversible stage in the mid-2000s.

⁴ Ibid.

The Pierrelatte uranium enrichment plant has now been fully decommissioned. The operations involved dismantling 4,000 diffusers, 1,330 tons of diffusion barriers, and 1,200 km of piping. **Decommissioning of the Marcoule UP 1 reprocessing facility began in 1997 and will continue until 2040.** The first phase of clean-up and dismantlement of the G1, G2 and G3 plutonium producing reactors at Marcoule has been completed, and the second phase of dismantlement will be carried out once facilities for disposal of the waste produced are open.

The national investment of France in the dismantling of its fissile material production facilities is unique among nuclear-weapon States and illustrates the national effort being made towards concrete progress in the field of disarmament.

3) Commitment to the conclusion of a fissile material cut-off treaty

France considers the **initiation of negotiations on a fissile material cut-off treaty**, at the Conference on Disarmament and on the basis of document [CD/1299](#) (often referred to as the “Shannon mandate”), to be a priority. Such negotiations are **the next logical step, at the multilateral level, in creating the conditions for a world without nuclear weapons** in keeping with the objectives of the Treaty on the Non-Proliferation of Nuclear Weapons by means of a realistic approach based on concrete, progressive measures. Pending the launch of negotiations, France supports the deepening of technical discussions on the modalities of a fissile material cut-off treaty at the Conference on Disarmament.

A treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices would be a major step towards disarmament, as it should make it possible to set a **quantitative limit** on arsenals by stopping the production of fissile material for the manufacture of nuclear weapons. Such a treaty would be the indispensable complement to the Comprehensive Nuclear-Test-Ban Treaty. It therefore seems essential that such a treaty cover all countries possessing nuclear weapons today.

Pending the negotiation and entry into force of such a treaty, France encourages **all States concerned** that have not yet done so to declare and implement a **moratorium** on the production of fissile material for nuclear weapons.

France reaffirmed the importance it attaches to a fissile material cut-off treaty by proposing a draft treaty as a working paper at the Review Conference in April 2015. It also participated in the Group of Governmental Experts on the fissile material cut-off treaty in 2014–2015, the high-level expert preparatory group in 2017–2018 and the subsidiary body on the prevention of nuclear war at the Conference on Disarmament in 2018. Through the European Union, France supports action 7, “Conclude a treaty banning fissile materials for nuclear weapons“, of the Agenda for Disarmament of the Secretary General of the United Nations. France is also continuing its advocacy, including advocacy with the P5, for the launch of negotiations.

C) *Activities to end nuclear testing and promotion of the Comprehensive Nuclear-Test-Ban Treaty*

1) Complete cessation of nuclear tests

France ended all its nuclear tests in 1996.

It signed the **Comprehensive Nuclear-Test-Ban Treaty** on 24 September 1996 and ratified it on 6 April 1998. France and the United Kingdom were, together, the first nuclear-weapon States to ratify the Treaty.

France is carrying out activities aimed at ensuring the safety and reliability of its nuclear weapons. These include a simulation programme and hydrodynamic experiments designed to model the performance of materials under extreme physical conditions and, more broadly, the functioning of the weapons. These activities are conducted in strict compliance with the Comprehensive Nuclear-Test-Ban Treaty, which prohibits all nuclear explosions, regardless of their intensity.

2) Complete and irreversible dismantling of the former Pacific Testing Centre

In 1996, at the same time as it ended nuclear testing, France decided to dismantle completely and irreversibly the sites of the Pacific Testing Centre, on the atolls of Mururoa and Fangataufa.

The dismantlement of the sites was completed in 1998, and clean-up operations were then conducted to eliminate any radiological risk. A team of experts from the International Atomic Energy Agency (IAEA) conducted an independent, comprehensive and objective evaluation of the present and future radiological conditions of the atolls of Mururoa and Fangataufa and concluded, in its 1998 report *The Radiological Situation at the Atolls of Mururoa and Fangataufa*, that there was no risk to health. France maintains radiological and geomechanical monitoring of the atolls to this day and shares the relevant data to support transparency measures.

3) Support for the Comprehensive Nuclear-Test-Ban Treaty

France actively supports efforts to promote accession to the Comprehensive Nuclear-Test-Ban Treaty by the States listed in annex 2 to the Treaty and by other States that have not acceded to the Treaty. France has made the entry into force of the Treaty its top priority when it comes to nuclear disarmament. France also mobilizes the European Union in support of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO). This support was illustrated by, inter alia, Council Decision 2018/298 of February 2018 and by the support of the European Union for action 4 of the Secretary-General's Agenda for Disarmament, entitled "Bring the Comprehensive Nuclear-Test-Ban Treaty into force".

France also provides **technical support to CTBTO**, in particular for the **completion of the verification regime** provided for under the Treaty. The following actions have been undertaken:

Regarding the International Monitoring System, France deploys and operates 16 stations in its territory and provides technical assistance for the operation and maintenance of 8 stations abroad. It also operates a radionuclide measurements laboratory certified by CTBTO. The last station for which France is responsible, in Guadeloupe, was completed and became operational on 5 December 2019. **With the certification of that station, on 25 November 2020, France became the first nuclear-weapon State to make its full contribution to the International Monitoring System and consequently to be fully compliant with its commitments under the Treaty: ratification, dismantlement of nuclear facilities and construction of monitoring stations.**

France also contributes to the engineering work necessary to implement the International Monitoring System, in particular regarding new technologies such as infrasound (sensors, station engineering, and calibration techniques) and the measurement of noble gases. France has committed to supporting other States signatories to the Comprehensive Nuclear-Test-Ban Treaty to put in place and operate similar techniques through bilateral collaboration and arrangements and through capacity-building programmes led by the Provisional Technical Secretariat of the CTBTO Preparatory Commission.

The National Data Centre of France supports the development of the CTBTO International Data Centre by providing software (infrasound data analysis, performance monitoring tools for the network of stations) and by seeking innovative solutions. In that way, France participates actively in the evaluation of the verification regime's effectiveness, maintains close relations with many national data centres and contributes to their development through the provision of software tools for analysing International Monitoring System data. France has provided a software package ("NDC-in-a-Box") to CTBTO, which has been made available to the national data centres of Member States. France has also provided several training courses on the use of these tools.

Regarding on-site inspection capacity, France contributes directly to the development of the inspection system (inspector training, inspection techniques, and preparation for and participation in major exercises such as the Integrated Field Exercise 2014 (IFE14) and exercises by parties, which held the launch phase in 2019 in Vienna).

D) Activities relating to nuclear disarmament verification

France considers its work on nuclear disarmament verification to be a priority for nuclear disarmament and a contribution to the fulfilment of its obligations under article VI of the Non-Proliferation Treaty. In this regard, France supports action 8 (on supporting nuclear disarmament verification) of the Agenda for Disarmament of the Secretary-General of the United Nations. The President of the Republic reaffirmed on 7 February 2020 that the country's investment in this area would be continued, as a disarmament treaty can be valuable only if its provisions can be effectively verified. These endeavours are valuable as they allow nuclear-weapon States and non-nuclear-weapon States to build common knowledge and understanding on the issue of disarmament as a whole. While this multilateral approach brings challenges and risks in terms of the proliferation of sensitive information, France considers that discussions on verification conducted within the International Partnership for Nuclear Disarmament Verification (see below) and the dedicated group of governmental experts and within the framework of the Franco-German nuclear disarmament verification exercise (NuDiVe) are fully consistent with obligations under the Non-Proliferation Treaty. France remains extremely vigilant in this regard.

Verification is not an end in itself; it should be linked to a specific treaty, negotiated with the involvement and active participation of the nuclear-weapon States. Improving the international situation in terms of security and confidence between States is an indispensable prerequisite for the implementation of verification. Moreover, however crucial developing international nuclear disarmament verification at a multilateral level may be, bilateral and unilateral measures must be preserved as well. The current context should not hamper the conduct of nuclear disarmament verification work, which will facilitate the work of future negotiators and the conclusion of a treaty on verifiable nuclear disarmament.

1) International Partnership for Nuclear Disarmament Verification

France has actively participated in the work of the **International Partnership for Nuclear Disarmament Verification** since 2015. As a nuclear-weapon State, France has a realistic and constructive viewpoint regarding possible modalities for nuclear disarmament verification, including with non-nuclear-weapon States, taking into account non-proliferation and national security concerns. This work is crucial to understanding international verification issues.

The Partnership's work remains theoretical and does not pre-empt future verification regimes, which will be linked to disarmament treaties and will stem from

the negotiation of those treaties. The Partnership enables in-depth knowledge-sharing and thought-provoking discussions between the represented States, which leads to a better understanding of nuclear disarmament verification.

2) Franco-German nuclear disarmament verification exercise (NuDiVe)

During phase II (2017–2019) and phase III (2019–2023), France and Germany jointly led two exercises simulating the use of tools and procedures suited to realistic nuclear disarmament verification.

The two Franco-German nuclear disarmament verification (NuDiVe) exercises were held in late September 2019 and early April 2022 at the Jülich research centre in Germany. Respectively, they brought together experts of 13 and 11 nationalities, and sought to simulate inspection procedures to ensure that nuclear material was not diverted during the dismantlement of a nuclear warhead, since such dismantlement must be conducted behind closed doors pursuant to non-proliferation obligations.

The success and the findings of the NuDiVe exercises should encourage greater multilateral involvement in nuclear disarmament verification and provide in-depth understanding and elements for consideration in future work on the issue.

3) Group of Governmental Experts on Nuclear Disarmament Verification

France actively participated in the 2018–2019 Group of Governmental Experts established pursuant to General Assembly resolution [71/67](#), concerning nuclear disarmament verification, which concluded by issuing a consensus report in which it recommended that work be continued and set out possible avenues of action for the future. The establishment of the Group provided an opportunity for open discussion on nuclear disarmament verification in a United Nations format that brought together non-nuclear-weapon States, nuclear-weapon States and nuclear-weapon-possessing States.

At the seventy-fourth session of the General Assembly of the United Nations, France voted in favour of resolution [74/50](#), establishing a second group of governmental experts to “further consider nuclear disarmament verification issues”. France will remain fully involved, to ensure a constructive and realistic discussion during the meetings of the second group.

iii. Transparency and confidence-building measures

France is committed to transparency among the five nuclear-weapon States parties to the Treaty on the Non-Proliferation of Nuclear Weapons and vis-à-vis non-nuclear-weapon States.

It contributes to this at the national level through regular transparency efforts concerning:

- **Its deterrence doctrine** and the fundamental principles underlying it. France has publicly presented its doctrine and transparency efforts on numerous occasions, including at the Conference on Disarmament, and will continue to do so, including at the tenth Review Conference. France sees this as an important contribution to the stability and predictability of relations among nuclear-weapon States and between those States and non-nuclear-weapon States.
- **Its nuclear forces.** The following should be noted in particular:
 - The announcement that France has **fewer than 300 weapons**.
 - The announcement that France has **no nuclear weapons in reserve**.

- The announcement and confirmations of the **de-targeting of nuclear weapons**.
- **Pre-launch notification of all space and ballistic missile launches under the International Code of Conduct against Ballistic Missile Proliferation.** Between January 2015 and November 2021, France issued 75 pre-launch notifications, equal to the number of French space and ballistic missile launches conducted during that period. In addition, a statement is published each year, in keeping with the confidence-building and transparency measures laid down in the International Code of Conduct, outlining French policy on ballistic missiles and spacecraft. Lastly, for the first time in the history of the International Code of Conduct and in fulfilment of one of its provisions, France hosted in 2011 an inspection by international observers at the Guiana Space Centre in Kourou.
- Regular official publications, including open work for Parliament, on these forces and the budgetary efforts dedicated to deterrence. Under the Military Programming Act 2014–2019, **€3.88 billion was dedicated to French nuclear deterrence per year on average, which represented approximately 12 per cent of the defence budget** for that period. For the period covered by the Military Planning Act 2019–2023, the overall budgetary effort for deterrence amounts to approximately **€5 billion per year** (12.5 per cent of the defence budget and 0.19 per cent of the gross domestic product for that period).
- **The concrete disarmament measures** undertaken by France, in particular the dismantling of its nuclear testing facilities in the Pacific and of the Pierrelatte and Marcoule facilities for the production of fissile materials for weapons. In an unprecedented transparency effort, France organized two visits to its former fissile material production facilities in 2008 and 2009. **France organized another visit to the Pierrelatte and Marcoule facilities for representatives of 40 States members of the Conference on Disarmament**, which took place on 5 February 2020. It was also arranged for States members of the Conference on Disarmament to visit Luxeuil and Albion in 2015.

France had the Pacific Testing Centre open from 1996 to 1998. International experts were tasked with assessing the environmental effects of French testing and issued an International Atomic Energy Agency (IAEA) report. **In an unprecedented measure for a nuclear-weapon State**, radiological and geophysical monitoring measures, which were all conducted on site, were made public.

The unreserved commitment of France to the Comprehensive Nuclear-Test-Ban Treaty and to the deployment of its monitoring system is also a confidence-building and transparency measure to assure the international community that the country complies with its commitment to not carry out nuclear tests.

France has continued to contribute to nuclear disarmament transparency efforts in the context of the P5 Process.

The five nuclear-weapon States have a special duty to maintain the authority and primacy of the Non-Proliferation Treaty, which is the cornerstone of the non-proliferation regime and a key instrument for our collective security.

The dialogue between nuclear-weapon States, within the P5 Process, helps to build trust and contributes, by its very nature, to reducing strategic risks.

The P5 Process, established in 2009, has continued and deepened in recent years, through high-level conferences and expert-level meetings, in order to further the dialogue on strategic stability, nuclear disarmament and nuclear non-proliferation.

The P5 conferences in Beijing in February 2019 and in London in February 2020 agreed on a road map for the work of the P5 which cover the three pillars of the Non-Proliferation Treaty. As the coordinator of the P5 Process for 2021 and 2022, France has been ensuring the implementation of the joint road map, by means including the convening of a conference of the P5 “Principals” in Paris on 2 and 3 December 2021, with the aim of making a positive and concrete contribution to the upcoming Review Conference, as follows:

- Regular exchanges between members of the P5 **about their respective nuclear doctrines and policies and on strategic stability** began in 2016. This expert dialogue was further developed so as to address directly important international security issues and the contribution of the P5 to reducing strategic risks and promoting strategic stability.
- A second edition of the **common glossary of key nuclear terms** was approved in December 2021. This will be an update to the first edition of the glossary, which was presented in 2015. This work helps to foster a common understanding with regard to certain key technical and political concepts, thereby contributing to strategic dialogue.
- France remains committed to making progress on **strategic risk reduction** with its P5 partners and others, as the President of the Republic recalled in his speech on 7 February 2020. The work on strategic risk reduction should contribute to strategic stability and avoid the escalation of conflicts by identifying possible additional risk reduction measures. In the run-up to the NPT Review Conference, the efforts of France are aimed at linking discussions on risk reduction to strategic realities and creating a space for dialogue on this subject between nuclear-weapon States and non-nuclear-weapon States. In this spirit, France has very much welcomed the discussions initiated under the Creating an Environment for Nuclear Disarmament initiative since July 2019.
- Several P5 expert meetings **on a fissile material cut-off treaty**, coordinated by France, were also held in 2019 and 2021, in order to continue the consideration of issues related to such a treaty, with a view to preparing for the future negotiation of a non-discriminatory, multilateral and internationally and effectively verifiable treaty on the basis of consensus and with the participation of all relevant countries, within the framework of the Conference on Disarmament and in accordance with document [CD/1299](#) and the mandate contained therein.
- The dialogue with the Association of Southeast Asian Nations countries was resumed, with a view to making progress with regard to the signing of the Protocol to the Treaty on the Southeast Asia Nuclear Weapon-Free Zone (**Treaty of Bangkok**).
- **Discussions were held on the peaceful uses of nuclear technologies** and on nuclear safety and security, with a view to enabling the benefits of civil nuclear energy to be shared as safely as possible while ensuring non-proliferation.

However, those discussions were suspended in the light of the war waged by Russia in Ukraine, and its violation of the commitments it had made under the Budapest Memorandum. With the aim of avoiding a complete shutdown of the channels of communication among the nuclear-weapon States, the possibility of exchanges among experts on the subject of nuclear doctrines and strategic risk reduction has nevertheless been left open.

iv. Other relevant actions

Nuclear disarmament makes sense only if it does not lead to an arms race in other areas. It needs to be viewed as part of **general and complete disarmament**, in accordance with article VI of the Non-Proliferation Treaty.

The resolute action of France regarding nuclear disarmament therefore goes hand in hand with disarmament measures in other areas.

France is the depositary State of the **1925 Protocol** for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare. It has also been a State party to the **Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction** since 1993. France has worked towards the universalization of the Chemical Weapons Convention through national and European initiatives. France supports the efforts of the Organization for the Prohibition of Chemical Weapons to address the challenge posed by the re-emergence of the use of chemical weapons. It therefore supported the establishment in June 2018 of the Investigation and Identification Team tasked with identifying the perpetrators of chemical weapons attacks. In its first report, published on 8 April 2020, the Team established the responsibility of the Syrian air force in relation to three chemical attacks, using sarin and chlorine, on the village of Ltamenah in March 2017. In its second report, dated 12 April 2021, it concluded that a Syrian air force helicopter had conducted a chlorine attack on the village of Saraqib in February 2018. Further reports of the Investigation and Identification Team are expected.

At the twenty-fifth session of the Conference of the States Parties to the Chemical Weapons Convention in April 2021, France, on behalf of 46 delegations, presented the decision entitled “Addressing the Possession and Use of Chemical Weapons by the Syrian Arab Republic”, which was adopted by a large majority. This decision allowed for measures to be taken against the Syrian regime in the light of its repeated failures to comply with its obligations under the Convention, including by using chemical weapons on several occasions, as confirmed by the Organisation for the Prohibition of Chemical Weapons. Those measures include depriving it of its right to vote in the Executive Council and the Conference of the States Parties and preventing it from standing for election to the Executive Council, the Conference of the States Parties or subsidiary bodies of the Organisation until such time as it complies with its obligations under the Chemical Weapons Convention.

In January 2018, France established the **International Partnership against Impunity for the Use of Chemical Weapons**, which now includes over 40 States as well as the European Union which, in joining, have expressed their rejection of impunity for those who develop and use chemical weapons. The Partnership is a voluntary association of States whose objective is to denounce persons involved in the development or use of chemical weapons. One of the ways in which the Partnership works is by publishing on its website the names of persons sanctioned for their role in chemical attacks or in the development of chemical programmes (“naming and shaming”). The Partnership is based on six commitments: to collect, compile, record and preserve available information on perpetrators of chemical attacks and those involved in chemical programmes; to exchange this information and transmit it to relevant organizations; to use the available mechanisms to name and sanction individuals, entities and groups involved in the use of chemical weapons; to publish these names on a shared list via a dedicated website; to cooperate in building the capacity of States to take restrictive measures; and to coordinate positions in forums dealing with these issues.

France is working to strengthen the implementation and universalization of the **Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction**. For several years, it has been putting forward proposals to improve confidence and transparency between States parties and to make certain provisions of the Convention operational, such as the collective security clause in article VII and the clause on the peaceful uses of biology (see article X). In 2019, France successfully chaired the Meeting of the States Parties to the Convention. As Chair, it was particularly active in support of the universalization of the Convention and the preservation of its proper functioning. The debates concerned substantive issues, that is, the work of the meetings of experts, and took place in a constructive atmosphere. Ahead of the Ninth Review Conference, the French chairpersonship has shared its thoughts on methodological issues through a Chair's paper distributed to all States parties. France has thus paved the way for a successful Review Conference in 2022.

France has also become a party to various multilateral conventional disarmament and arms control instruments.

It is a party to the **Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects** and has ratified all of the additional protocols thereto. Since 2013, the High Contracting Parties to the Convention on Certain Conventional Weapons have been conducting discussions on lethal autonomous weapons systems within the framework of the Convention. France actively contributes to the work of the Group of Governmental Experts on this subject established in 2016 and supports the Group's efforts to define aspects of a normative and operational framework aimed at ensuring that international humanitarian law is respected in the development and use of weapons systems based on emerging lethal autonomous weapons systems technologies. The fact that France chaired the Sixth Review Conference of the High Contracting Parties to the Convention on Certain Conventional Weapons (held in December 2021) is a sign of its commitment to that forum.

France is also a party to the **Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction** (Ottawa Convention) and Convention on Cluster Munitions the Convention on Cluster Munitions (Oslo Convention). It has fully implemented its obligations under those conventions, ahead of the deadlines required under the instruments. France has been a party to the **Arms Trade Treaty** since its entry into force in 2014. It supports the dual objectives of this Treaty, which are to improve the regulation of the international trade in conventional arms while helping to curb the illicit trafficking in and diversion of these weapons. It promotes the universalization of the Treaty, which had 111 States Parties as at 1 July 2022, and actively participates in the permanent working groups. Through the European Union's Arms Trade Treaty implementation support project, France promotes adherence to the Treaty and supports several States in establishing and strengthening their national conventional arms transfer control systems, in line with the provisions of the Treaty. As a State member of the European Union, France must also meet common export criteria of Council Common Position 2008/944/CFSP of 8 December 2008, as amended by Council Decision (CFSP) 2019/1560 of 16 September 2019, which sets out common rules for the export of military technology and equipment in order to preserve international peace and security. The common position was updated in 2019, notably in order to take into account the provisions of the Arms Trade Treaty.

France is a party to the **Protocol against the Illicit Manufacturing of and Trafficking in Firearms, Their Parts and Components and Ammunition**, supplementing the United Nations Convention against Transnational Organized

Crime. Furthermore, France participates actively in the United Nations Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects and chaired the third United Nations Conference to Review Progress Made in the Implementation of the Programme of Action, held in 2018.

France is also a party to all the conventional arms control instruments (the **Treaty on Conventional Armed Forces in Europe, the Treaty on Open Skies and the Vienna Document**), which were backed by the Conference on Security and Co-operation in Europe, now the Organization for Security and Cooperation in Europe, and which help to increase transparency and confidence among States in the Euro-Atlantic area and to reduce the risks of misunderstandings and escalation.

In accordance with its obligations under these instruments and thanks to the technical expertise of personnel trained in verification, France carries out **frequent verification activities** with other States parties, namely on-site inspections, assessments and observation overflights over the territories of States parties. **France continues to implement its commitments fully** and works to **preserve and strengthen the gains that have been made**. Furthermore, France is actively participating in the inclusive informal discussions of the **structured dialogue** initiated in 2017, which are aimed at “creating an environment conducive to reinvigorating conventional arms control in Europe”.

Section II: National non-proliferation measures

The proliferation of nuclear weapons and their means of delivery is a threat to international peace and security, as well as to the peace and security of the regions concerned. France therefore considers it imperative to resolutely oppose such proliferation. The actions taken by France to combat nuclear proliferation and to promote implementation of the Treaty on the Non-Proliferation of Nuclear Weapons and the action plan of the 2010 Review Conference have three strategic priorities: strengthening the non-proliferation regime; responding to proliferation crises; and further developing efforts to prevent and impede proliferation.

i. Implementation of and support for safeguards

France is committed to the IAEA safeguards regime, which is at the heart of the non-proliferation regime and the strengthening thereof. France itself is subject to many checks by IAEA and by the European Atomic Energy Community (Euratom).

A) French safeguard commitments

Voluntary offer agreement: With a view to strengthening the safeguards system, France has offered to make certain civil nuclear material subject to IAEA safeguards. The safeguards are applied under a trilateral agreement between France, Euratom and IAEA (INFCIRC/290), which entered into force in 1981.

France has also voluntarily agreed to transmit the following additional information to IAEA:

- Notification of imports and exports of nuclear material (INFCIRC/207/Add.1, 1984)
- Notification of imports and exports of concentrates of uranium and thorium (INFCIRC/415, 1992)
- Annual statement of holdings of civil irradiated and unirradiated plutonium and highly enriched uranium (INFCIRC/549, 1998)

On 25 February 2019, the amended version of the small quantities protocol for French territories in the Caribbean took effect, in accordance with Additional Protocol I to the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (Treaty of Tlatelolco). Nuclear materials and associated locations in those territories are consequently subject to comprehensive safeguards as from that date.

To enhance the ability of IAEA to detect possible clandestine nuclear activities carried out by non-nuclear-weapon States, France signed an additional protocol to its safeguards agreement (which entered into force on 30 April 2004). The additional protocol is an essential instrument in the efforts of France in respect of nuclear non-proliferation.

The two following points in the French additional protocol warrant special attention:

- **Right to complementary access.** IAEA inspectors may, with at least 24 hours' notice, request access to any location on French territory – and so to any nuclear facility – in order to resolve any question as to the accuracy and completeness of the information provided pursuant to the provisions of the protocol, or to resolve certain contradictions in that information and to cross-check for possible evidence of clandestine nuclear activity by a non-nuclear-weapon State. The complementary access methodology and the activities inspectors may engage in during such access (environmental sampling, measuring, etc.) are similar to those provided for in the model additional protocol proposed by IAEA.
- **Provision to IAEA of information on cooperation with non-nuclear-weapon States relating to all aspects of the fuel cycle.** For example, France informs IAEA of its plans for nuclear cooperation involving the fuel cycle with non-nuclear-weapon States over the next 10 years.

B) *Safeguards inspections by the European Atomic Energy Community*

Like its European Union partners, **France is subject to safeguards inspections by the European Atomic Energy Community (Euratom) relating to all civil nuclear material** covered by the Treaty establishing Euratom. As a result, **all French facilities holding civil nuclear materials are subject to Euratom inspection**. Such inspection seeks to verify that the use of those materials is consistent with that declared by the users.

C) *As a result of these inspections, the French civil nuclear cycle is one of the most monitored in the world*

Because of the number and variety of nuclear facilities in French territory, the country is subject to major inspections covering all facilities involved in civil nuclear activities.

Certain nuclear fuel cycle facilities in France are subject to on-site IAEA safeguards verification. The Georges Besse II centrifuge enrichment plant is subject to **inspections equivalent to those conducted by IAEA and by the European Commission at similar facilities in European non-nuclear-weapon States**, while some parts of the La Hague reprocessing and recycling plant and the Melox MOX fuel fabrication plant are also subject to IAEA safeguards verification. These facilities, like all other civil nuclear facilities in France, are also subject to Euratom safeguards inspections. Consequently, **taking into account both the Euratom and the IAEA inspections, the spent fuel reprocessing plant at La Hague is the most inspected facility in Europe.**

In 2020, Euratom inspection activities in France were reduced, owing to the pandemic and quarantine measures, to a total of 249 inspections (as compared with

315 in 2019) and 1,074 person-days of inspection (as compared with 1,410 in 2019). The reporting of accounting items was maintained in full and carried out on time, with 258,900 accounting items submitted (as compared with 253,500 in 2019). France remains the most inspected country in the European Union. IAEA verification activities in France also decreased. There were 14 inspections (as compared with 23 in 2019) and 80 person-days of inspection (as compared with 110 in 2019). Accounting declarations, such as those under the additional protocol, were sent in full and on time.

D) *Political, technical and financial support for safeguards*

• Political support

France has worked to promote the additional protocol in its national capacity and in multilateral forums. Ahead of the tenth Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, France has intensified its efforts to promote the additional protocol, especially with regard to States that have not yet ratified such a protocol. France also actively supports European Union initiatives to promote the additional protocol and the amended small quantities protocol, through financial contributions and targeted diplomatic efforts.

The implementation of an additional protocol is the only way for IAEA to provide credible assurances of the absence of undeclared nuclear material and activities. **France considers that an additional protocol to a comprehensive safeguards agreement represents the current verification standard under article III of the Non-Proliferation Treaty**, which will strengthen the non-proliferation regime and contribute to further enhancing international peace and security. At relevant meetings of the IAEA Board of Governors and at the IAEA General Conference, France has consistently called for the universalization of the comprehensive safeguards agreement and the additional protocol thereto as the verification standard for non-nuclear-weapon States. France supports the Agency's activities to make States aware of the importance of the principles of universality and the strengthening of safeguards.

France has demonstrated its commitment to continuously enhancing the efficiency and effectiveness of the IAEA safeguards system, in particular through the implementation of safeguards at the State level. France supports the State-level concept and its application through State-level safeguards approaches. State-level approaches should be developed and implemented, in close consultation with the State and/or regional authority concerned, for all States with any type of safeguards agreement in force. Following a request from France, a State-level approach was developed in 2020 by IAEA for that country, in close consultation with Euratom.

• Technical and financial support

France is committed to the central role played by the IAEA safeguards system and seeks to ensure that IAEA has the requisite human, financial and technical resources to fulfil the mandate from the international community, thereby enabling it to ensure the credibility of its verification mission. In response to challenges presented by the coronavirus disease (COVID-19) pandemic, France, Germany and the United Kingdom have jointly committed €750,000 to IAEA charter flight operations to enable IAEA inspectors to perform their crucial safeguards work, including in Iran.

The French support programme for IAEA safeguards was established in 1983 to translate the political support of France for the IAEA verification mission into concrete and technical terms. Under the programme, technology transfer, financial contributions and expert advice are provided to help the IAEA Department of

Safeguards make its verification methods more technically and economically efficient.

The French support programme for IAEA safeguards is one of the largest national support programmes. Since 2010, France has allocated approximately €6 million to the IAEA Department of Safeguards, primarily through this programme. In 2021 alone, €400,000 was allocated to the programme. This is an extrabudgetary contribution from France, which comes in addition to the regular annual support it contributes to the IAEA budget. The latter contribution amounted to more than €21 million in 2020 (€17 million for the regular budget and €3.8 million for the Technical Cooperation Fund). France has made several one-off contributions, including €1 million to be paid between 2020 and 2022 to support the refurbishment of the LG-SIMS mass spectrometer, a critical tool for the Agency's safeguards verification activities, as well as €500,000 in 2020, followed by an additional €2 million in 2021, for the Agency's verification of the implementation of the Joint Comprehensive Plan of Action.

France has also contributed to the efforts of the European Union to support IAEA verification, particularly as regards the following:

- European Commission IAEA nuclear safeguards support programme
- Contributions to the renovation of IAEA safeguards laboratories (Enhancing Capabilities of the Safeguards Analytical Services project)

French laboratories also participate in the IAEA network of safeguards analytical laboratories, which is aimed at increasing capacities for independent analysis of nuclear material samples and of swipe samples collected during the Agency's verification activities.

E) Permanent safeguards for nuclear transfers required as part of French civil nuclear cooperation

The intergovernmental agreements underpinning the commitment of France to civil nuclear cooperation with third countries contain specific clauses that make the materials, goods and equipment subject to IAEA safeguards (which apply under agreements concluded between these countries and IAEA). Should those safeguards not be applicable, the parties are expected to implement a mutually agreed system of safeguards, the effectiveness and scope of which are equivalent to those of IAEA. These intergovernmental agreements generally stipulate that the safeguards provisions shall continue to apply even if the agreement is terminated or expires.

ii. Export controls

• Active participation of France in international regimes for the control of exports of technologies related to weapons of mass destruction

As a member of the Zangger Committee, the Nuclear Suppliers Group, the Australia Group, the Wassenaar Arrangement and the Missile Technology Control Regime, France contributes to international counter-proliferation efforts, in particular those aimed at updating control lists, ensuring the relevance of those lists in the light of technological developments, and raising awareness among non-member States on the need to strengthen their export controls. France is the Missile Technology Control Regime permanent point of contact. As such, it receives and distributes Missile Technology Control Regime documents to the Regime's partners, hosts intersessional meetings and participates in outreach activities. Furthermore, France hosts the plenary sessions of the Australia Group, which usually take place every June.

- **Implementation of export control at the national level**

The **bilateral agreements** governing the development of the civil nuclear cooperation of France with third countries reflect the commitments made by France in the framework of the Nuclear Suppliers Group, such as the obligation to obtain assurances from the consignee in case of transfer or retransfer.

The **control lists** established at European Union level by Regulation (EU) 2021/821 (which compiles the control lists of dual-use items from all export control regimes), and the list of military equipment covered by Council Common Position 2008/944/CFSP defining common rules governing control of exports of military technology and equipment, are directly applicable at the national level. **They require European Union member States to implement control procedures with regard to transfers and to contribute to the implementation of their commitments under international export control regimes or as States parties to non-proliferation treaties and provisions.** These lists are regularly updated on the basis of the lists of the Wassenaar Arrangement, the Missile Technology Control Regime, the Nuclear Suppliers Group, the Australia Group and the Chemical Weapons Convention, in order to take into account the evolution of technologies and proliferation issues.

The transfer of goods in these two categories requires prior authorization from the State authority. Under its import and export control prerogatives, the customs administration contributes to combating trafficking in sensitive products in the categories of dual-use items and technologies and war materiel and related items.

Proliferation due to the transfer of dual-use items is a considerable control challenge for States. To address this challenge, article 7(1) of Regulation (EU) 2021/821 contains a clause referring to article 4(1) of the Regulation, which enables the authorities of European Union member States to control the export of non-listed items where there is a risk that they may be intended, in their entirety or in part, for use in connection with weapons of mass destruction.

- **Contribution to national capacity-building efforts**

A significant portion of the budget of the **Chemical, Biological, Radiological and Nuclear Risk Mitigation Centres of Excellence of the European Union** (totalling over €20 million a year) is devoted to financial, technical and operational assistance to third countries in order to help them strengthen their export control systems.

iii. *Nuclear security*

France supports the implementation of the highest standards of nuclear security worldwide and is committed to strengthening international cooperation and assistance in this field.

- *Ratification of international conventions*

France has been a party to all **relevant international instruments** in this area since ratifying the 2005 Amendment to the Convention on the Physical Protection of Nuclear Material, on 1 February 2013, and the International Convention for the Suppression of Acts of Nuclear Terrorism, on 11 September 2013. In 2020, France updated and translated into English its national report on the implementation of the Convention on the Physical Protection of Nuclear Material.

- *Implementation of IAEA recommendations*

France has made great progress on implementing the Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5, *IAEA Nuclear Security Series*, No. 13). French regulations incorporate all the provisions of the IAEA circular and go even further in

some cases. France hosted an International Physical Protection Advisory Service peer review mission led by IAEA in November 2011 and a follow-up mission in 2018, which found that the French nuclear security regime was “robust and well established”.

- *Action plan signed with IAEA to support its activities*

In April 2005, France signed an action plan with IAEA (renewed in 2013) to support IAEA nuclear and radiological security activities, particularly in the areas of cybersecurity, strengthening of national nuclear security systems, physical protection of nuclear material, nuclear material accounting, security of radioactive sources, detection and response.

France contributes to the IAEA nuclear security fund every year in order to fund assistance projects, and hosts technical visits and training, in particular for French-speaking African countries. For instance, France hosted training for various French-speaking countries in 2016 and 2018 and training for Niger on nuclear and radiological security for major events in 2019. It also hosted a delegation from Burkina Faso, which came for training in nuclear and radiological material forensics, in July 2019. More recently, in October 2021, France supported IAEA by contributing to training in Cameroon on nuclear and radiological security for major events, ahead of the Africa Cup of Nations.

France also finances projects on the security and repatriation of radioactive sources and contributes to the translation of IAEA recommendations into French. It allocates more than €11 million to the Agency’s nuclear security activities.

Moreover, France supports IAEA within the European Union, as evidenced by Council Decision (CFSP) 2020/1656 of 6 November 2020.

In 2020, France also provided financial support to the International Criminal Police Organization (INTERPOL) for the strengthening of the capacities of chemical, biological, radiological and nuclear first responders in the Sahel region.

- *Efforts to minimize highly enriched uranium*

France supports international efforts to minimize the use of highly enriched uranium for civilian purposes, where economically and technically feasible. Since 2010, France has been working with a number of partner States to identify alternative technologies that do not require the use of highly enriched uranium in the production of medical radioisotopes and the manufacture of fuel for high-performance research reactors.

- *Efforts to secure radioactive sources*

The potential use of radioactive sources for malicious purposes poses a real threat to international security. France therefore signed an agreement with IAEA in 2011 to identify sources exported by French companies and to secure those sources in the countries where they are now located or, where that is impossible, to bring them back to France for processing. This work has already made it possible to conduct a wide-ranging survey of exported high-activity sealed radioactive sources. Of the 300 sources thus identified, just under 200 require action. The repatriation decision will be taken for each source on a case-by-case basis. Several repatriation operations have already taken place in recent years and exploratory missions are under way for possible future repatriations.

At the Nuclear Security Summit held in Washington, D.C. in 2016, the President of the French Republic proposed an initiative to enhance highly enriched uranium security through activities in three main priority areas:

- Strengthening the international regulatory framework applicable to these sources by improving the application of existing instruments and by assessing any requirements expected under new instruments
- Reducing the use of highly enriched uranium by increasing the use of alternative technologies
- Strengthening cooperation between suppliers of these sources in order to develop common good practices that better address end-of-life management of the materials

A joint statement has been signed by 28 States and INTERPOL. It was opened for signature by all IAEA member States in December 2016, under the symbol INFCIRC/910, and four additional States have since signed it. France held side-events on this subject during the International Conference on the Security of Radioactive Material, held in Vienna in December 2018, and the International Conference on Nuclear Security, held in February 2020. Alongside Germany and the United States of America, France co-chairs an annual technical meeting to identify and promote initiatives on alternative technologies to high-activity radioactive sources.

France has committed to implement the Code of Conduct on the Safety and Security of Radioactive Sources and the two supplementary guidance documents on the import and export of radioactive sources and the management of disused radioactive sources.

Lastly, with regard to French domestic law, a new decree came into force on 1 January 2020 to strengthen measures for protecting sources of ionizing radiation and batches of radioactive sources from malicious acts. The decree is consistent with the recommendations of IAEA, in particular.

- *Participation in other international initiatives*

France participates actively in the work of the Global Initiative to Combat Nuclear Terrorism. In 2019, France chaired the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, which aims to strengthen international cooperation and develop international assistance projects. As Chair of the Group of Seven Nuclear Safety and Security Group, it coordinated diplomatic action to promote the universalization of the international nuclear security conventions. France is also a member of the Nuclear Security Contact Group, which was launched in 2016 to address major nuclear security issues at the international level.

In addition to playing a leading role in relation to the Joint Statement on Strengthening the Security of High Activity Sealed Radioactive Sources (INFCIRC/910), France contributed actively to the Nuclear Security Summit working group on transport and signed the Joint Statement on Transport Security of Nuclear Materials (INFCIRC/909). France signed the Joint Statement on Mitigating Insider Threats (INFCIRC/908) during the third International Conference on Nuclear Security in February 2020.

iv. Nuclear-weapon-free zones

France has long supported the establishment of nuclear-weapon-free zones. This regional approach is an important means of promoting disarmament and non-proliferation.

- *Ratification of protocols to treaties establishing nuclear-weapon-free zones*

France is a party to the protocols to the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (Treaty of Tlatelolco), the South Pacific

Nuclear Free Zone Treaty (Treaty of Rarotonga), the African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba) and the Treaty on a Nuclear-Weapon-Free Zone in Central Asia (Treaty of Semipalatinsk). The Protocol to the Treaty of Semipalatinsk was signed jointly by the members of P5, along with the five countries of Central Asia, in 2014.

In 2012, France and Mongolia signed two parallel declarations on the latter's nuclear-weapon-free status.

In addition, France is a party to the Antarctic Treaty of 1959, which bans nuclear tests and weapons in Antarctica.

On 25 February 2019, the amended version of the small quantities protocol for French territories in the Caribbean took effect, in accordance with Additional Protocol I to the Treaty of Tlatelolco. Nuclear materials and associated locations in these territories are consequently subject to comprehensive safeguards as from that date.

- *Outlook for the signature of new protocols*

With respect to the **South-East Asia Nuclear-Weapon-Free Zone established under the Treaty of Bangkok**, France is engaged in dialogue with the countries of the Association of Southeast Asian Nations in order to find solutions acceptable to all parties.

- *Middle East zones free of nuclear weapons, other weapons of mass destruction and their delivery systems*

From the outset, France has supported the plan to create a Middle East zone free of weapons of mass destruction and their delivery systems. France calls for the implementation of the resolution on the Middle East adopted by the 1995 Review and Extension Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, in order to make progress towards sustainable peace in the Middle East.

France intends to help create the conditions for achievement of the objectives of the 1995 resolution on the Middle East. **It is working towards that goal, in particular, through unrelenting efforts to contribute to the reduction of regional tensions, especially with respect to the Middle East peace process** and, more broadly, through its determined action to create conditions for the de-escalation of tensions in the region. France also works to **ensure that all States parties to the Non-Proliferation Treaty comply with their nuclear non-proliferation commitments.** It is resolutely engaged in diplomatic efforts to bring Iran and the United States back into compliance with the Joint Comprehensive Plan of Action on the Iranian nuclear programme, adopted in 2015, and to preserve this agreement, which is an essential contribution to security in the region and a key instrument of the non-proliferation regime.

France also contributes to the implementation of the 1995 resolution by **resolutely supporting the universalization of the main non-proliferation instruments**, which are factors for collective security, in its bilateral relations with the countries of the region and in relevant multilateral forums. France calls upon all States that have not yet acceded to the Treaty on the Non-Proliferation of Nuclear Weapons to do so, and encourages States of the region to accede swiftly to the other existing conventions and instruments on the non-proliferation of weapons of mass destruction and their delivery systems.

France participated, as an observer State, in the two sessions of the Conference on the Establishment of a Middle East Zone Free of Nuclear Weapons and Other Weapons of Mass Destruction, held in New York in 2019 and 2021 pursuant to

General Assembly Resolution 73/546. France reiterates its long-standing commitment to the goal of establishing such a zone and to the inclusive, consensus-based process, taking into account the security interests of all States in the region, aimed at achieving that goal.

France also supports and contributes to European Union action in that regard, including through the Council decision of 6 June 2019 allocating a budget of almost €3 million to foster confidence and dialogue. France also fully supports the work of the United Nations Institute for Disarmament Research, which should help foster inclusive dialogue between experts and policymakers.

v. ***Compliance with non-proliferation commitments and other issues***

Proliferation crises constitute **serious threats to international and regional security and stability**. They are also an **obstacle to the development of civil nuclear cooperation** and impede disarmament by undermining mutual trust. With the worsening of these crises, it is more vital than ever to make decisions on the consequences of a proven violation of the Non-Proliferation Treaty (non-compliance) or abuse of the right of withdrawal (article X of the Treaty).

A) ***Proliferation crises***

• *Islamic Republic of Iran*

E3 (France, Germany and the United Kingdom), the European Union, the United States, Russia, China and Iran concluded a long-term agreement on the Iranian nuclear issue, the Joint Comprehensive Plan of Action, in Vienna on 14 July 2015, following a year and a half of negotiations. The Plan was endorsed by United Nations Security Council resolution [2231 \(2015\)](#), which was adopted on 20 July 2015. In keeping with its position of supporting the development of a peaceful civilian nuclear programme in Iran and of refusing to accept the acquisition of nuclear weapons by Tehran, France engaged in the negotiations with determination. Its position of constructive firmness helped ensure that the Plan was robust, sustainable and verifiable.

The Joint Comprehensive Plan of Action limits the nuclear capabilities of Iran in order to prevent a proliferation crisis and prevent Tehran from accessing a nuclear weapon. To that end, it introduces restrictions, of various durations, limiting the country's enrichment capabilities, material stockpiles, sensitive activities (research and development, reprocessing) and weapons-related activities. It also establishes a very tight transparency and verification regime, verified by IAEA.

The withdrawal of the United States from the Plan on 8 May 2018 did not put an end to the deal. Despite the steps taken progressively by Iran since July 2019 to disengage from the agreement, France and other participants have continued to implement it and to pursue efforts that go beyond their obligations in order to preserve it.

Following the decision taken by the administration of the United States in January 2021 to resume implementation the Plan insofar as Iran resumed compliance with its obligations, France has engaged with the utmost determination, alongside its partners, in diplomatic efforts to restore the non-proliferation benefits of the Plan.

Nevertheless, at the time of publication of this report, France is deeply concerned that, several months after having finalized a package of documents in Vienna with all the participants in the Plan that would see Iran return to compliance with the agreement and would see the United States rejoin it, Iran has not taken that opportunity. Furthermore, the pursuit by Iran of nuclear activities contrary to the provisions of the agreement, which are of unprecedented gravity; and by the

significant reduction in that country's cooperation with IAEA, which has prevented the Agency from carrying out the mandate entrusted to it under Security Council resolution 2231 (2015), are making a return to the implementation of the Plan ever more difficult.

France is also extremely concerned that, because of a lack of any significant cooperation from Iran, IAEA has been unable to shed light on the pending issues connected with the implementation of safeguards in that country in the context of the comprehensive safeguards agreement entered into by Iran as part of its obligations under the Non-Proliferation Treaty. That issue is separate from the issue of the Joint Comprehensive Plan of Action.

- *Democratic People's Republic of Korea*

France remains deeply concerned by the pursuit and continued modernization by **the Democratic People's Republic of Korea of its nuclear weapons and ballistic missile programmes**, in violation of resolutions of the United Nations Security Council. These programmes are a serious threat to regional and international peace and security. France has firmly and systematically condemned the six nuclear tests carried out by North Korea since 2006 and its multiple illegal ballistic missile launches.

The international community's aim continues to be for the Democratic People's Republic of Korea to abandon all its nuclear programmes and weapons of mass destruction and ballistic missile programmes in a complete, verifiable and irreversible manner. Pyongyang must comply with the resolutions of the Security Council and its obligations under the Non-Proliferation Treaty and abstain from any step that could increase tensions. France calls upon the Democratic People's Republic of Korea to abide by its obligations under the Non-Proliferation Treaty and its IAEA safeguards agreements and to ratify the Comprehensive Nuclear-Test-Ban Treaty.

France supports diplomatic initiatives aimed at making progress on this issue with a view to the complete, verifiable and irreversible denuclearization of North Korea. It encourages the Democratic People's Republic of Korea to return to the negotiating table with the United States, take concrete measures to dismantle the infrastructure linked to its illicit programmes, destroy or transfer its nuclear materials and weapons and delivery systems, and cease all transfers of nuclear and ballistic capacities and technologies to third countries. Nuclear-weapon States and IAEA will also have a role to play in these tasks, for which France is prepared to provide its expertise.

The international community needs to remain united in the face of North Korean proliferation. As a permanent member of the United Nations Security Council, France has supported the adoption of resolutions instituting sanctions against the North Korean regime, as well as proposals for additional designations under this framework. The sanctions regime is an indispensable tool for leading the Democratic People's Republic of Korea to abandon its weapons of mass destruction programmes, upholding the second pillar of the Non-Proliferation Treaty and encouraging the country to engage in negotiations in good faith. France is playing its full part in this effort, together with its partners, with the aim of ensuring complete enforcement of sanctions by the international community.

B) *Withdrawal (article X)*

France has taken an active part in the debate on the possibility of withdrawal from the Treaty on the Non-Proliferation of Nuclear Weapons (article X) and its consequences occasioned by the announcement by the Democratic People's Republic of Korea on 10 January 2003 of its intention to withdraw from the Treaty.

States parties' adoption of measures on that issue, which has been under debate for almost two decades, is essential to the Treaty's credibility and integrity and to the consolidation of the nuclear non-proliferation regime. It is unacceptable for any State having benefited from the provisions and cooperation provided for in article IV to acquire nuclear materials, facilities and technologies to then withdraw from the Treaty with impunity and use the resources so acquired for military purposes, or to withdraw after diverting them from civilian to military purposes in violation of the Treaty.

The point of this initiative is not to deny States the right of withdrawal, which is conferred by the Treaty itself in article X. Rather, the point is to recall how that right, which is circumscribed both by the Treaty and by international law, must be exercised, and especially to orchestrate the best possible response by the international community in case of abuse of the right of withdrawal.

France has supported proposals made in various working papers produced by the European Union, the United States, the Russian Federation, Ukraine and other States parties. These proposals are in agreement on many points, such as the need for rapid consultations between States parties; the central role of IAEA in verifying compliance with international non-proliferation obligations in advance of such withdrawal; and the importance of maintaining effective control over the nuclear materials and equipment of the State that has given notice of its withdrawal.

C) *Non-compliance of Syria with its safeguards agreement*

France remains seriously concerned about the lack of cooperation and progress on long-outstanding questions regarding the Dair Alzour site and the three other locations in Syria, as reported in IAEA reports. France deeply regrets that, after the IAEA Board of Governors found Syria to be non-compliant with its safeguards agreement, and despite repeated calls from the Director General of the Agency, Syria has yet to provide the necessary cooperation and resolve all outstanding safeguards issues. France urges Syria to comply fully with the resolution of the IAEA Board of Governors of June 2011 by concluding and bringing into force an additional protocol as soon as possible.

vi. *Other contributions to nuclear weapons non-proliferation*

• *Financial oversight*

France participates in the work of the Financial Action Task Force (FATF) to establish international recommendations for the criminalization of the financing of proliferation in all its forms and of complicity in such action. France helped draw up FATF recommendation 7, adopted in February 2012, in which States are called upon to implement targeted financial sanctions against persons financing activities prohibited by Security Council resolutions adopted under Chapter VII of the Charter of the United Nations.

Pursuant to this international recommendation, France has now included the offence of financing of proliferation in its Defence Code through the adoption Act No. 2011-266 of 14 March 2011 on combating the proliferation of weapons of mass destruction and their delivery systems. The law imposes criminal penalties of 15 to 20 years in prison and a fine of €7.5 million on any person having provided, collected or managed funds, securities or assets of whatever kind for the conduct of an activity related to proliferation. France encourages States that have not yet done so to strengthen their national legislation similarly.

At its plenary meeting held in Paris from 18 to 23 February 2018, FATF adopted guidance on combating the financing of proliferation, recalling that the domestic laws

of States must provide for an offence of financing of proliferation and for legal measures to freeze the assets of those involved in such offences.

- *Counter-proliferation policy*

France participates in efforts to intercept assets used in proliferation, and in 2003 was among the States that launched the Proliferation Security Initiative. It is a member of the Initiative's Operational Experts Group, which brings together the 21 States most invested in counter-proliferation operations. France is also active within the Initiative's Mediterranean Initiative, launched jointly with Germany, at the initiative of France, in 2013 with the aim of strengthening capacities to impede proliferation flows on both sides of the Mediterranean. France implements the principles of the Mediterranean Initiative through the Proliferation Interception Plan. This Plan, which was updated in 2021, sets out the national action framework for addressing the proliferation of sensitive goods and technologies related to weapons of mass destruction. France hosted the high-level political meeting of the Proliferation Security Initiative in 2018, on the occasion of the Initiative's fifteenth anniversary.

In 2018, France ratified the 2005 Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation. The Convention provides for international maritime law measures to combat the proliferation of weapons of mass destruction, including nuclear weapons and their delivery systems. It provides France with new counter-proliferation opportunities by enabling it to address prevention.

After ratifying the Convention, France introduced provisions into its domestic law making it possible to board a foreign ship suspected of proliferation sailing on the high seas.

- *Combating intangible transfers and the dissemination of knowledge and expertise*

Transfers of expertise and sensitive technology can be hijacked and applied to the proliferation of weapons of mass destruction and their delivery systems. In particular, preventing non-State actors from acquiring proliferation-related information and expertise remains a key challenge.

To prevent such hijacking, in France, of knowledge and expertise that could contribute to the development of proliferation programmes, whether nuclear, biological, chemical or ballistic, France has now supplemented its legislation for the protection of French scientific and technical potential, which was established under Decree No. 2011-1425 of 2 November 2011, with a section on counter-proliferation. The protection plan applies to public and private French entities in possession of sensitive know-how or technologies.

- *Support for implementation of Security Council resolution 1540 (2004)*

France provides support for the implementation of United Nations Security Council resolution [1540 \(2004\)](#). Since 2004, France has provided assistance in the form of bilateral actions for requesting States and has made contributions to the Trust Fund for Global and Regional Disarmament Activities of the Committee established pursuant to the resolution.

France provided an updated report on its implementation of resolution [1540 \(2004\)](#) in 2015, when French law was strengthened considerably with regard to nuclear, biological and chemical security and counter-proliferation. France submitted its latest report on 20 April 2020.

France has contributed financially to support the implementation of resolution [1540 \(2004\)](#).

Section III: National measures relating to the peaceful uses of nuclear energy

France, as an experienced and long-term user of a wide range of nuclear technologies, covering the entire nuclear fuel cycle, nuclear power production and other applications, is fully committed to the development of civil nuclear cooperation. Nuclear energy continues to be the main component of the French electricity mix, and the French fleet of nuclear power plants is one of the largest, safest and most efficient in the world. As nuclear energy is a very low-carbon energy, it makes a significant contribution to the fight against climate change and to the achievement of the objectives of the Paris Agreement on climate change and, more broadly, the Sustainable Development Goals. It also ensures a secure supply of energy for France and as well as its European partners.

With 2,600 companies and 220,000 direct and indirect employees, the nuclear industry is the third largest industrial sector in France. The industry, which has been supported by a strategic sector contract since 2019, remains particularly active in fostering innovation, competitiveness, safety and the circular economy.

France is therefore developing partnerships with a large number of States that are interested in developing nuclear energy in accordance with the highest standards of non-proliferation, safety, security and respect for the environment.

- i. Promotion of peaceful uses*
- A) Support for the development of energy applications**

- *Sharing of nuclear technologies and expertise*

France actively shares its broad nuclear expertise internationally through bilateral collaboration and through multilateral activities such as those organized by IAEA. Examples of its areas of expertise include the following:

- Design and construction of third-generation reactors which meet the most stringent safety and security standards, over the entire lifespan of the equipment. The first two EPRs have been successfully put into operation in China, while the Finnish EPR was connected to the grid in 2022 and the construction of two EPR units in the United Kingdom is ongoing. Building on lessons learned from those projects, an optimized version of the EPR, or “EPR2”, is being developed to be more competitive, especially in terms of cost and construction duration. The EPR2 is the first reactor to be wholly digitally designed and is conceived for integration in grids with a high proportion of renewable energy in the mix.
- Safe and efficient long-term operation of reactors, with a fleet of 56 power reactors currently in operation. France is currently providing an expert to IAEA to support experience-sharing and the development of guidance on managing the long-term operation of reactors and on combining nuclear power with renewable energy sources in advanced low-carbon energy systems. The project is receiving strong financial support under the France Relance and France 2030 plans.
- Supplying services along the entire nuclear fuel cycle, from the front-end to the back-end, including in the form of activities related to the closure of the fuel cycle, radioactive waste management, the maintenance of a secure and sustainable fuel supply and the safe management of materials.
- Development of ambitious new nuclear systems. In 2019, the French 340 MWe small modular reactor project, known as NUWARD, was launched by industrial

partners in the nuclear field (Alternative Energies and Atomic Energy Commission, Electricité de France, Naval Group and TechnicAtome).

- Contribution to the technologies of the future through the International Thermonuclear Experimental Reactor project, which brings together the European Union, India, the Russian Federation, China, the Republic of Korea, Japan and the United States.
- Essential support for research and development in the field of material testing through the construction of the Jules Horowitz Reactor, which was carried out with partners from the Czech Republic, Spain, Finland, Belgium, the United Kingdom, Sweden, India, Israel and the European Commission. The Jules Horowitz Reactor was designated an International Centre based on Research Reactors by IAEA in 2015 and is used to help IAEA member States quickly gain access to nuclear infrastructure based on research reactors.

In 2022, France submitted a working paper presenting the country's nuclear power expertise and know-how, and its export capabilities in terms of technology and services, international cooperation for capacity-building, and the provision of financing.

- *Institutional efforts to guarantee responsible nuclear cooperation*

France cooperates with a **growing number of countries and pays special attention to the stated needs of countries developing nuclear power programmes.**

France offers those of its partners that wish to develop a nuclear power programme coordinated assistance in the preparation of the necessary infrastructure (regulatory, administrative, scientific and safety), in order to ensure effective development of their civil nuclear programmes over the long term. This support can be seen in action in the activities of the International Relations Directorate of the Alternative Energies and Atomic Energy Commission and its network of nuclear advisers at embassies.

France ensures that its civil nuclear cooperation with other States is long-term and commensurate with the issues. This governance is ensured through civil nuclear energy cooperation agreements, which encourage partner countries to accede to international nuclear conventions and standards (such as nuclear safety and security conventions, the Vienna Convention on Civil Liability for Nuclear Damage and the additional protocol to the comprehensive safeguards agreement).

France submitted a working document to the Preparatory Committee in 2019 (supported by 12 countries: Belgium, Canada, Cyprus, Finland, France, Greece, Latvia, Mexico, Niger, Portugal, Romania and Ukraine) in order to share best practices concerning the governance of civil nuclear cooperation through intergovernmental agreements. The goal of such a framework is to underline the benefits of intergovernmental agreements in the field of peaceful nuclear activities, in order to facilitate cooperation with newcomers and all interested countries and promote the responsible and sustainable development of peaceful nuclear programmes, whether they concern nuclear energy or non-energy applications, through strengthened cooperation, in accordance with the highest international standards of nuclear safety, security, safeguards, non-proliferation and environmental protection.

France is also involved in assisting countries in developing the legal framework and infrastructure for their nuclear programmes. Since 2010, France has supported an expert at the IAEA Nuclear Infrastructure Development Section. The Section uses a step-by-step approach to help newcomers develop this essential infrastructure. Furthermore, since 2020, France has provided a Junior Professional Officer to IAEA

to work on issues concerning small modular reactors. The flexible uses of these reactors are of particular interest to candidate countries interested in nuclear energy and related applications such as seawater desalination and heating systems.

- *Priority given to training*

France has developed a specific training system closely linked to the needs and control of the nuclear industry and to research. The training offered covers all of the professions and skills required in the sector.

The National Institute of Nuclear Sciences and Technologies (INSTN), attached to the Alternative Energies and Atomic Energy Commission (CEA), is an applied training school for low-carbon energy and health technology. INSTN has been an IAEA Collaborating Centre since 2016. It trains partners in nuclear power programmes, research programmes, and programmes to develop nuclear applications for health.

Foreign students enjoy broad access to the training: every year, approximately 20 per cent of those graduating from French master's programmes in nuclear energy are foreign nationals. The International Institute of Nuclear Energy (I2EN), which provides information on all French training in this area, is the gateway for all foreign students who wish to benefit from such training.

French academic programmes are supplemented by the country's hosting of IAEA fellows, professionals and students, for internships in or study visits to hospital services (radiotherapy and nuclear medicine units in particular), research institutes and industry players. Since 2020, France has also provided support to the new IAEA Marie Skłodowska-Curie Fellowship Programme, which provides scholarships to women students in nuclear-related master's programmes around the world.

In parallel with the September 2014 meetings of the IAEA Board of Governors, France launched a capacity-building initiative on the peaceful uses of nuclear energy. The initiative was designed to strengthen the effectiveness of international cooperation to meet the rising demand for assistance from States participating in training for the first time.

Since 2018, France has been hosting an IAEA training course on nuclear programme financing. In 2019, France hosted more than 40 IAEA scientific visits and study trips. In 2020, France trained more than 30 experts through an online course but, owing to restrictions related to COVID-19, the number of IAEA scientific visits and study trips had to be scaled down.

At the industrial level, French nuclear sector companies are highly committed to developing local human capital. They also offer targeted industrial training covering the whole nuclear energy production cycle.

- *Support for international initiatives related to the nuclear fuel cycle*

Since 2010, France and its European partners have been financially and technically committed to the establishment, under the aegis of IAEA, of a nuclear low enriched uranium bank in Kazakhstan, to provide guaranteed access to nuclear fuel for States unable to obtain it on the regular competitive market. The bank was inaugurated on 24 August 2017 and entered into service on 17 October 2019, following the receipt of its first delivery of low enriched uranium. It received a second delivery on 10 December 2019, thereby reaching full storage capacity. A French firm has supplied some of the low enriched uranium stored in the bank.

B) Nuclear applications for development

The peaceful uses of nuclear energy promoted by the third pillar do not exclusively concern the energy sector. Thanks to innovative techniques, nuclear science offers a wide range of applications in health (diagnosis and treatment of diseases, including cancer and coronary heart disease, thanks to the continuous development of nuclear medicine), agriculture, nutrition and food security (improvement of crop production using advanced irrigation techniques, such as isotopic mapping), access to drinking water, and the protection of cultural heritage (dating, authenticity and preservation of works).

France is involved in an IAEA research project in Reunion on controlling mosquitoes that carry malaria, dengue fever and chikungunya using the sterile insect technique. Since 2020, France has been providing a Junior Professional Officer to IAEA to contribute to its work on the sterile insect technique.

France launched a call to use nuclear energy to improve the understanding, preservation and promotion of heritage. At the session of the Preparatory Committee in 2019, France, together with Brazil, Egypt and the Netherlands, initiated the statement on nuclear techniques in relation to cultural heritage. The statement was co-sponsored by Australia, Portugal and the United Kingdom. In that statement, the undeniable role of nuclear applications in the preservation of cultural and natural heritage was reiterated, and States parties to the Non-Proliferation Treaty were encouraged to develop nuclear techniques to further such preservation. In 2021, the University of Paris-Saclay was designated as the first IAEA collaborating centre in the area of heritage sciences. In order to continue promoting the use of nuclear techniques in the preservation of cultural heritage and to encourage the sharing of know-how in that field, Brazil, Egypt, France and the Netherlands submitted a paper on the subject at the tenth Review Conference.

ii. Provision of technical assistance through the International Atomic Energy Agency to its member States

France actively supports the activities of the Department of Nuclear Energy for the development of the infrastructure necessary for the establishment of a nuclear power programme through the provision of experts and financial contributions and the organization of training and technical meetings in France.

The IAEA technical cooperation programme supports member States' efforts to acquire nuclear technology. France supports the programme through participation of its experts in projects and through **extrabudgetary contributions**, in addition to its contribution to the Technical Cooperation Fund, for the funding of "footnote-a/" projects. It contributes more than €4 million to the Fund every year.

Health is a priority area of action for France, which makes regular financial contributions to the Agency's Programme of Action for Cancer Therapy; receives and treats radiation accident victims in specialized units, with the support of the Percy military hospital, the Institute of Nuclear Protection and Safety and the Alternative Energies and Atomic Energy Commission;⁵ supports research programmes of the IAEA Department of Nuclear Sciences and Applications aimed at combating infectious diseases; and sponsors partnerships between IAEA and French institutions such as the Research Institute for Development and the National Cancer Institute. France has made provision for a contribution of €500,000 to the Rays of

⁵ France organized a side event on this issue on the margins of the IAEA General Conference in September 2019 and advocates stronger international cooperation on the provision of treatment for victims of radiation accidents.

Hope initiative launched by the IAEA Director-General. The initiative is seeking to help Member States with little capacity to combat cancer to gain access to nuclear medicine. In addition, beginning in late 2022, France will be providing IAEA with a Junior Professional Officer to contribute to efforts as part of the IAEA Programme of Action for Cancer Therapy (PACT).

France is also active in the development of nuclear technologies with applications in the fields of **agriculture** and the **environment**. It participates, for example, in the financing of technical cooperation projects in Africa designed to improve crop production through advanced irrigation techniques.

iii. Civil nuclear safety and civil nuclear liability

A) Action to strengthen the safety framework

France considers that the magnitude of the accident at the Fukushima Daiichi nuclear plant and its consequences have confirmed the need for a policy of making nuclear safety and transparency absolute requirements. The French authorities have always advocated improving nuclear safety worldwide, maintaining it at the highest level and fostering the development of a responsible nuclear energy sector at the international level.

1) On French territory

In 2011 and 2012 France carried out **additional safety evaluations**, not only of nuclear reactors but also of research facilities and nuclear fuel cycle plants. A **national action plan**, published in December 2012 by the Nuclear Safety Authority following those evaluations, underwent a peer review at the European level, which concluded with a seminar organized by the European Nuclear Safety Regulators Group in Brussels in 2013 and with an update in 2014, followed by a new cross-review in 2015. At the end of 2019, France confirmed that all measures to be taken within the framework of the European Union stress tests had been implemented.

As described in the most recently updated version of the national action plan (December 2017), the Nuclear Safety Authority issued a number of directions (around 35 per nuclear power plant) to improve the safety and robustness of plants. These directions address and go beyond the issues identified by the peer review of the European stress tests.

They have led to the implementation of several modifications at French nuclear power plants, such as strengthened measures against internal and external risks, additional electrical power sources, additional means of prevention, enhanced serious accident management and strengthened crisis management. These modifications have made it possible to address the recommendations of the European Nuclear Safety Regulators Group resulting from the peer review of the European stress tests.

Furthermore, additional modifications will be implemented at French nuclear power plants as part of continuous improvement efforts, taking the Generation III reactor safety objectives as a point of reference, in particular through regular periodic safety assessments.

At the end of 2019, the first European Union topical peer review was concluded. Council Directive 2014/87/Euratom of 8 July 2014 institutes a six-monthly peer review of a technical aspect relating to the safety of nuclear facilities. The topic of the first round of reviews was the management of ageing for nuclear reactors. The Nuclear Safety Authority acted as coordinator, and contributions were made by the Institute for Radiological Protection and Nuclear Safety, Electricité de France, the Alternative Energies and Atomic Energy Commission, the Institut Laue-Langevin and large fuel cycle facilities. The peer review provided an opportunity to identify good

practices and areas for improvement in French facilities. An action plan was developed to address the conclusions of the review.

France also hosted IAEA peer-review missions on nuclear safety. The annual Operational Safety Review Team mission and the Integrated Regulatory Review Service missions in 2006, 2009, 2014 and 2017 concluded that France had significantly bolstered its framework for the control of nuclear safety and radiation protection. In 2018, France hosted an ARTEMIS mission, which evaluated the country's system for the management of radioactive waste with regard to IAEA safety guidelines, technical recommendations, and best practices implemented internationally. The report underscores that France has established a framework for the management of radioactive waste that addresses all issues and has many strong points, including in terms of skills and robust and constant progress. All of these actions were conducted in a spirit of transparency. France has published reports on the Integrated Regulatory Review Service and Operational Safety Review Team peer review missions conducted on French soil. It has also published the schedule of past and planned missions.

Lastly, France has sought to **enhance its preparedness and its response to nuclear and radiological crises** by drawing up and disseminating a national crisis management plan. The operators of nuclear facilities have also participated in this effort by establishing emergency response teams (the Electricité de France Force d'Action Rapide Nucléaire and the Orano Force d'Intervention Nationale).

2) At the international level

- *Support for the International Atomic Energy Agency*

France contributed to the definition and implementation of the IAEA Action Plan on Nuclear Safety. Subsequently, in December 2012, it published a national version of the IAEA Action Plan, which was most recently updated in December 2017.

- *Strengthening of the international safety framework*

France is committed to the universalization and strengthening of the international conventions related to nuclear safety. It actively participated in the working group on effectiveness and transparency, responsible for making proposals to strengthen the Convention on Nuclear Safety, and in the diplomatic process in support of a proposal to amend the Convention on Nuclear Safety, held on 9 February 2015, which resulted in the Vienna Declaration on Nuclear Safety. Since the seventh review cycle of the Convention on Nuclear Safety, which culminated in the seventh review meeting of the contracting parties to the Convention in 2017, every contracting party has had to take the provisions of the Vienna Declaration into account when preparing their national reports. Owing to the COVID-19 pandemic, the eighth review meeting, scheduled for 2020, has been postponed to March 2023 and will be merged with the ninth review meeting.

In 2019, France chaired the Group of Seven Nuclear Safety and Security Group which, in close collaboration with multilateral organizations, provides technically informed policy advice on issues that could have an impact on safety and security in respect of the peaceful uses of nuclear energy. The Group published a report⁶ in which it stressed the importance of the Non-Proliferation Treaty in relation to the use of nuclear energy for peaceful purposes and highlighted the need for the robust implementation by all States of the highest nuclear safety, security and non-proliferation standards in order to ensure the continued and responsible use of nuclear energy worldwide. It also underlined the need to ensure the long-term

⁶ <https://www.elysee.fr/admin/upload/default/0001/05/dfc69eabc63d7e2af920c1c1d216424235fc2c24.pdf>.

availability of sustainable high-level scientific expertise and specialized research to support nuclear safety decisions by licensees and competent authorities. In connection with this requirement, France contributes to the current IAEA activities to develop technical and scientific capacity in support of regulatory functions.

At the European level, France, through its Nuclear Safety Authority, plays a key and active role within the Western European Nuclear Regulators Association, currently chaired by the Director-General of the Nuclear Safety Authority. The Association aims to develop a common approach to nuclear safety and the regulation thereof, particularly within the European Union. The association's key products, the "safety reference levels" documents, promote harmonization of safety approaches in relation to nuclear power reactors, radioactive waste, spent fuel disposal and decommissioning.

Alongside the regulatory activities undertaken by the Nuclear Safety Authority, France – which uses the scientific expertise provided by its technical safety body, the Institute for Radiological Protection and Nuclear Safety, for safety assessments and radiation protection studies – can provide assistance to countries wishing to develop technical and scientific capabilities in the areas of safety, radiation protection, environmental assessments, security and crisis management.

In conducting its expertise and research activities, the Institute for Radiological Protection and Nuclear Safety benefits from its active participation in the European Technical Safety Organisations Network. The Network enables its members to develop common positions and approaches, in order to better address expertise-related, technical and scientific challenges, on the basis of a wide variety of experiences and technologies. The Network's activities may be useful beyond the borders of Europe.

The Institute for Radiological Protection and Nuclear Safety is already involved in a number of historic, well-established and mutually beneficial cooperation activities with nuclear and non-nuclear countries in the above-mentioned areas. New partnerships will be favourably considered, with the goal of achieving mutual benefits in the long term.

With regard to safety and radiation protection, France is conducting solid, specific research (including fuel safety research). The facilities and tools used in its research can be shared through appropriate mechanisms.

Lastly, it is worth mentioning that France, through the European RISKAUDIT group (France and Germany), is actively involved in supporting countries throughout the world that wish to improve their nuclear safety infrastructure, within the framework of the European Instrument for International Nuclear Safety Cooperation.

- *Cooperation in the field of regulatory assistance*

The French Nuclear Safety Authority provides regulatory assistance to third States through bilateral cooperation actions or through multilateral instruments, to help such States to establish a robust safety regulatory framework and an independent safety authority, and to develop a culture of safety.

The Authority actively supports activities aimed at helping countries developing nuclear programmes to establish a competent independent regulatory body. In particular, it is involved in nuclear safety assistance and cooperation activities conducted by the European Union under the Instrument for Nuclear Safety Cooperation.

The objectives of the Instrument include:

- Supporting the promotion and implementation of the highest nuclear safety and radiation protection standards in respect of nuclear facilities and radiological practices in third countries
- Supporting the drafting and implementation of responsible strategies for the final disposal of spent fuel, waste management, the decommissioning of facilities and the clean-up of former nuclear sites

The tangible assistance provided by the Nuclear Safety Authority, through the Instrument for Nuclear Safety Cooperation, mainly took the form of assistance to nuclear safety authorities. In recent years, the Authority took part in projects to provide regulatory assistance to the safety authorities of China, Egypt, Morocco, Ukraine and Viet Nam. It is currently participating in the Instrument for Nuclear Safety Cooperation project aimed at helping the Turkish regulatory body to improve further its capacity to review safety assessment documentation independently and its inspection skills in relation to the monitoring of the new reactor that is under construction.

These actions are supplemented by other international technical assistance programmes, implemented in accordance with Group of Eight or IAEA resolutions on improving nuclear safety in third countries, which are funded by contributions from donor States and the European Union.

The Nuclear Safety Authority collaborates with many countries through bilateral agreements, including agreements signed with the regulatory bodies of the neighbouring countries of France. Bilateral relations between the Nuclear Safety Authority and its foreign counterparts are a priority focus area for international action. They allow responsive and direct interactions on topical subjects and the rapid implementation of cooperation measures. They also prove to be extremely useful in emergency situations, hence the will to increase interactions with our European neighbours.

- *Efforts concerning the transport of civil nuclear material*

France is also committed to ensuring safety and security in the transport of nuclear material. Together with Japan and the United Kingdom, France initiated a constructive dialogue with coastal States, within the framework of IAEA, which has led to the adoption of biannual road maps for specific actions to increase transparency and cooperation with coastal States. A number of activities have been organized in the framework of this dialogue, including two tabletop exercises in 2015 and 2017, field visits, the drafting of a precis on emergencies and preparedness and the production of educational videos. France assumed the chairpersonship of this informal dialogue again in September 2019. As Chair, France managed and improved the website for the communication and information secure dialogue. Several fact sheets related to the fuel cycle and transport packages were uploaded to the website. Australia took over as Chair of the dialogue in December 2020.

B) *Civil nuclear liability*

France supports the establishment of a global civil nuclear liability regime.

The existence of an adequate civil liability regime for nuclear operators in case of accidents is an essential condition for the responsible and sustainable development of nuclear energy. The universalization of such a regime is a major objective of the IAEA Action Plan on Nuclear Safety.

France and the United States initiated discussions regarding the bases and conditions for the establishment of a global civil liability regime for nuclear damage,

which resulted in the signature of a joint statement in August 2013. The statement reflects our two countries' common priorities in relation to the fundamental question of compensation for nuclear damage. It affirms our commitment to helping establish and develop a global civil nuclear liability regime based on treaty relations between States and enabling fair compensation for victims of nuclear accidents, as recommended in the IAEA Action Plan on Nuclear Safety, and encourages States to join such a regime.

France considers that the Vienna Convention on Civil Liability for Nuclear Damage and the Paris Convention on Third Party Liability in the Field of Nuclear Energy (which is associated with the Brussels Supplementary Convention), in their revised versions, together with the Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention, constitute an adequate basis for the compensation of nuclear damage.

iv. *Comprehensive Nuclear-Test-Ban Treaty Organization: scientific and civil applications*

The International Monitoring System and the International Data Centre, developed by the Provisional Technical Secretariat of the CTBTO Preparatory Commission to monitor global implementation of the nuclear test ban, have shown that they can also make a significant contribution to the safety and security of populations around the world.

Following the 2004 disaster in Indonesia, CTBTO, with the support of its States parties, began sharing International Monitoring System data for tsunami warnings. Several cooperation agreements have been signed under the umbrella of the United Nations Educational, Scientific and Cultural Organization (UNESCO) international tsunami warning programme. France has given authorization for data collected by its stations to be transferred in real time to assist tsunami warning centres. An agreement has been signed between CTBTO and IAEA, with the support of France, to allow data collected under the CTBTO verification regime to be shared in the event of a nuclear accident, in order to support analysis by IAEA experts.

Other applications are being developed with the support of French authorities and experts. These include infrasound detection to give advance warning of volcanic eruptions (protection of local populations) and predict the occurrence of ash clouds that could have an impact civil aviation, as well as radionuclide analysis by CTBTO stations to monitor global warming and forecast specific weather events (including monsoons).

France remains a strong supporter of using such scientific and civil applications for the benefit of all countries, with the understanding that these applications have to be implemented carefully and should not lessen the commitment of any State party to the Comprehensive Nuclear-Test-Ban Treaty and its core mission.

v. *Other matters*

France has made transparency and public information an essential part of its nuclear policy through:

- A strict policy of transparency and collective participation in the implementation of its nuclear projects, reinforced by Law No. 2006-686 of 13 June 2006 on nuclear transparency and safety, which established in particular a high committee for transparency and information regarding nuclear safety and bolstered the 53 local information committees.
- Sustained communication on matters related to nuclear energy.