

Urgent Recommendations

Russian Invasion of Ukraine: Challenges in the Civilian Use of Nuclear Energy and Japan's Role

Russia launched a military invasion of Ukraine on February 24, 2022, with two of the country's nuclear power plants—Chernobyl and Zaporizhzhia—seized by Russian troops. The Russian attack on the Zaporizhzhia plant, the largest in Europe and in operation at the time, particularly shocked the world, not only because it constitutes a gross violation of the Geneva Conventions and an IAEA General Conference resolution, but also because there was a real danger that the slightest misstep could lead to a devastating disaster involving a massive release of radioactive substances.

In light of this state of affairs, we present this set of urgent recommendations on how to address shortcomings of international conventions governing the protection of nuclear facilities and improve the protection of such facilities, as well as ways of seeking to ensure international nuclear fuel supplies and enhance the safety management of nuclear facilities in the future.

Study Group on Nuclear Non-Proliferation and Nuclear Security
Security Studies Program
Sasakawa Peace Foundation (SPF)

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About the Study Group on Nuclear Non-Proliferation and Nuclear Security

In a bid to contribute to the peace and stability of Japan, Asia, and the world, the Sasakawa Peace Foundation (SPF) established the International Peace and Security Department (currently named the Security Studies Program) to engage in relevant research activities and make policy recommendations based thereon.

In September 2018, the department launched research on nuclear energy and nuclear non-proliferation with the aim of exploring how Japan, as a forerunner in the civilian use of nuclear energy and the only country to have suffered nuclear attacks in war, can contribute to nuclear disarmament and nuclear non-proliferation in the world. A broad range of themes—including international management of plutonium, denuclearization of North Korea, global nuclear disarmament efforts, and Japan's role in the face of the rise of Russia and China in the international nuclear market—have been studied to date, leading to the publication of a series of policy recommendations.

In fiscal 2021, we set up a Study Group on Nuclear Non-Proliferation and Nuclear Security (hereinafter "Study Group"), with the addition of some new members, to explore ways to improve the effectiveness of monitoring and surveillance (safeguards) of nuclear facilities and nuclear material by the International Atomic Energy Agency (IAEA), an activity critical to the promotion of nuclear non-proliferation, and to enhance nuclear security in the face of the emergence of new threats such as cyberattacks.

The policy recommendations contained herein have been supported by the members of the Study Group. However, the Study Group itself does not take any specific position on the civilian use of nuclear energy.

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Urgent Recommendations

Russian Invasion of Ukraine amid the Increasingly Difficult Environment Surrounding Nuclear Non-Proliferation and Security

On February 24, 2022, Russia launched a military invasion of Ukraine, reawakening the world to the nuclear threat. Russian President Vladimir Putin wielded nuclear intimidation, ordering his nuclear forces into “special combat readiness.”¹ In addition, as many as 15 nuclear reactors in Ukraine have been exposed to the risk of war including urban warfare. On the first day of the invasion, the Chernobyl nuclear power plant (NPP) was seized by Russian troops. Located in the northern part of the country, the site is in the decommissioning stage, with all reactors out of service. On March 4, the Zaporizhzhia NPP, in the southeastern area, was similarly seized. With its six reactors, the Zaporizhzhia NPP is the largest nuclear power plant in Europe. There was concern that damage to any of its reactors or spent fuel storage facilities could cause massive radioactive leaks, posing an unprecedented threat to the world far greater than those previously assumed in the context of nuclear security. As of the end of May, the Zaporizhzhia NPP was still under Russian control,² and the International Atomic Energy Agency (IAEA) had expressed security concerns,³ including over the maintenance of 30 tons of nuclear material present at the site.

As a study group examining the reality and challenges of nuclear non-proliferation and nuclear security at a time when efforts to promote these goals face an increasingly difficult international environment, we could not overlook these Russian actions and decided to publish a set of urgent recommendations for the Japanese government on problems in the physical protection of nuclear facilities, as well as the future direction of international trends surrounding nuclear energy.

Recommendations

- 1. Together with European and other countries, Japan has requested the International Criminal Court (ICC) to investigate Russia for war crimes and violations of international treaties. The Japanese government should provide full support to the ICC investigation. In addition, it should play a leading role in international efforts to identify and address shortcomings in the existing international conventions banning military attacks on**

¹ See “Putin Declares a Nuclear Alert, and Biden Seeks De-escalation,” *The New York Times*, February 27, 2022. (Available only to subscribers)

² Following its annexation of the Crimean Peninsula in 2014, Russia submitted to the IAEA a statement saying that the nuclear facilities in the Crimea are under the jurisdiction of Russia and therefore the application of IAEA safeguards at these facilities should be in accordance with the safeguard agreement with Russia. See [IAEA Information Circular \(INFCIR/876\) dated June 10, 2015](#). According to the IAEA, the Zaporizhzhia NPP remained “controlled” by Russia as of May 31, 2022. See [IAEA Press Release, Update 78-IAEA Director General Statement on Situation in Ukraine](#) issued on May 31, 2022.

³ See “[Atomic energy chief: Ukraine’s nuclear safety situation ‘far from being resolved’](#),” POLITICO, May 10, 2022. Ukraine’s nuclear utility Energoatom has warned of a possible nuclear disaster at the Zaporizhzhia nuclear power plant, noting that Russians have explosives on the premises. See “[Zaporija Genpatsu ni Bakuhatsubutsu ‘Kaku no Daisanji no Osore’ Kosha Kikan](#)” [Ukraine’s Zaporizhzhia Nuclear Power Plant Operator Warns of Possible Disaster], NHK, June 1, 2022.

nuclear facilities, in particular, expediting efforts to identify the true nature of the Russian attacks on nuclear facilities by drawing on the experience and lessons of the accident at the Fukushima Daiichi Nuclear Power Station operated by Tokyo Electric Power Co., Inc. (TEPCO).

Japan is among a total of 43 countries requesting the ICC to investigate Russia for war crimes and violations of international treaties (as of April 21, 2022) and is the largest donor to the ICC. Also, as a country that experienced a devastating nuclear accident in Fukushima 11 years ago, Japan has a responsibility to promote international efforts to reinforce the safety of nuclear facilities by drawing on the lessons learned from the experience. Russia has come under fierce international criticism for its actions, including attacks on nuclear facilities in the course of its invasion of Ukraine. While providing full support to the ICC investigation, Japan should: identify challenges facing the relevant existing international treaties and conventions including Protocol I Additional to the Geneva Conventions that prohibits attacks on civilians and nuclear power plants; undertake diplomatic efforts to make necessary changes to the international agreements and strengthen their enforcement mechanisms; and seek international consensus on legal and political responses to violations including sanctions and the establishment of penal provisions.

2. The Japanese government should reconsider the current assumptions regarding the physical protection of nuclear facilities⁴ in Japan and call on the international community to work together to step up efforts to further strengthen nuclear security.

Although physical protection of nuclear facilities from military attacks is not covered by the IAEA's guidelines for physical protection of nuclear materials, it is necessary to thoroughly examine what lessons can be learned from the Russian military attacks on Ukraine's nuclear power plants. The government needs to examine whether the physical protection regime currently in place is sufficient, engaging various stakeholders—including local governments of host communities—in the process. Particularly, as a country that is home to sensitive nuclear facilities such as those for nuclear fuel reprocessing and in possession of a large amount of nuclear material, Japan should play a leading role in international efforts to further strengthen nuclear security. It should propose steps that would help enhance nuclear security worldwide. For instance, Japan can call for convening a conference of state parties to the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities on a regular basis and requiring state parties to report on their national initiatives undertaken based on a renewed awareness of threats to nuclear facilities. It can also call for the reconvening of the Nuclear Security Summit.

3. In light of the loss of Russian credibility in the international community, it is imperative to explore a new framework for international cooperation in order to ensure the safety of the existing nuclear facilities and secure nuclear fuel supply capabilities. Japan needs

⁴ The term “nuclear facilities” in this report refers to facilities in which nuclear material is present, such as nuclear power plants, research reactors, nuclear fuel cycle facilities, and spent nuclear fuel storage facilities.

to become involved in this international effort by identifying areas where it can contribute.

As a result of its invasion of Ukraine and the accompanying attacks on nuclear power plants, Russia, a leading nuclear energy player holding a large portion of the global market, has lost its credibility in the international community. Western countries that have led the world in the civilian use of nuclear energy need to explore a new framework for international cooperation to replace Russia as a major supplier of enriched uranium and a provider of maintenance services for its exported nuclear facilities.

Recommendation 1:

Together with European and other countries, Japan has requested the International Criminal Court (ICC) to investigate Russia for war crimes and violations of international treaties. The Japanese government should provide full support to the ICC investigation. In addition, it should play a leading role in international efforts to identify and address shortcomings in the existing international conventions banning military attacks on nuclear facilities, in particular, expediting efforts to identify the true nature of the Russian attacks on nuclear facilities by drawing on the experience and lessons of the accident at the Fukushima Daiichi Nuclear Power Station operated by Tokyo Electric Power Co., Inc. (TEPCO).

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It has been pointed out that Russia's invasion of Ukraine is a violation of the Charter of the United Nations (UN Charter). Shortly before launching its invasion on February 24, 2022, Russia unilaterally recognized the Donetsk and Luhansk "People's Republics," which had been formed by pro-Russian separatists who had taken effective control of the two oblasts in eastern Ukraine and declared independence from the country. Russia justifies its military actions as an exercise of the right of self-defense to protect these "republics." However, their independence has not been recognized by the international community and it is highly likely that Russian actions in Ukraine are in violation of Article 2, paragraph 4 of the UN Charter, which stipulates that: "All Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations."⁵ Meanwhile, in its ruling on March 16, 2022, made in response to Ukraine's

⁵ Shigeki Sakamoto, "[Rosia no Ukraina Shinko to Kokusaiho](#)" [Russian Invasion of Ukraine and International Law], *International Information Network Analysis (IINA)*, Sasakawa Peace Foundation, April 8, 2022.

request, the International Court of Justice (ICJ) issued provisional measures ordering Russia to “immediately suspend the military operations that it commenced on 24 February 2022 in the territory of Ukraine.” However, Russia refused to comply with the order, saying that the ICJ lacks jurisdiction over Russia. This appears to violate Article 94, paragraph 1 of the UN Charter, which states: “Each Member of the United Nations undertakes to comply with the decision of the International Court of Justice in any case to which it is a party.”⁶

Despite being a permanent member of the UN Security Council, Russia is in violation of multiple clauses of the UN Charter and other international law, but other permanent Security Council members and UN members are unable fix the situation.⁷ The same pattern of events has been observed many times in the nuclear energy domain.

Russian troops attacked and seized the Chernobyl NPP on February 24, 2022. Although the Chernobyl NPP is no longer in service, more than 100 safety workers and some 200 Ukrainian national guards in charge of the site’s security were trapped in the premises⁸, and the IAEA temporarily lost contact with monitoring systems installed there. On March 4, Russia captured the Zaporizhzhia nuclear plant, the largest in Europe in terms of generating capacity. Two of the six reactors were in operation when heavily armored Russian troops forced their way into the premises and set a training center ablaze by shelling. With Russian shells also directed at power cables and reactor buildings (housing No. 1 and No. 6 reactors), there was a real danger that any of the reactors or reactor containers could be damaged, causing a massive release of radioactive substances over a wide area.⁹

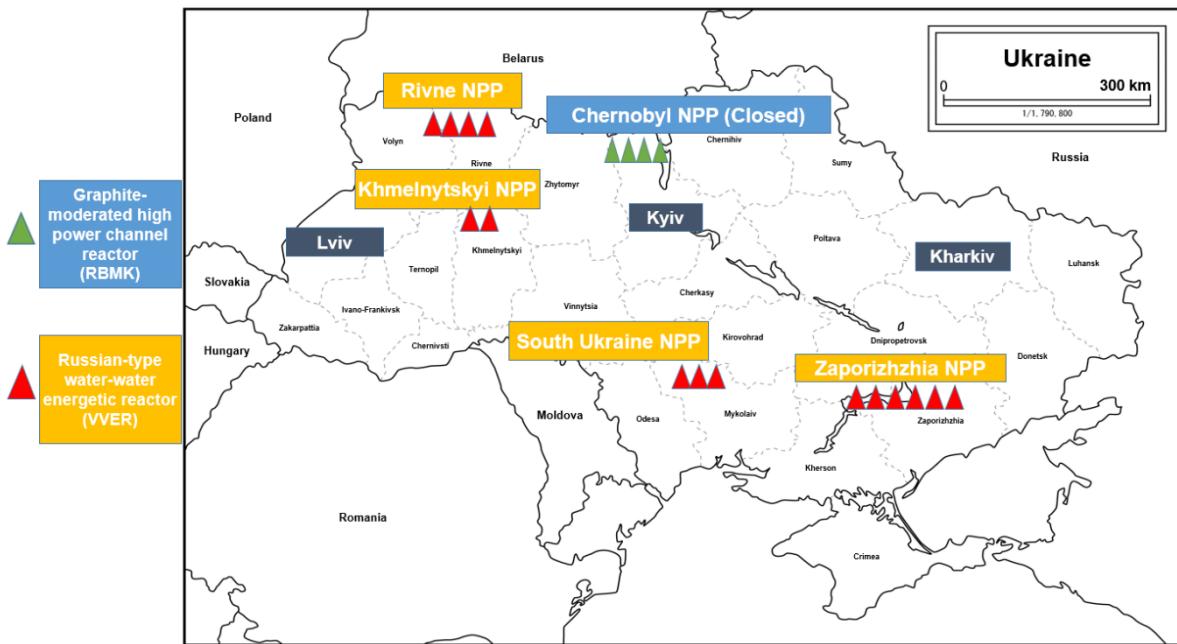
⁶ *Id.*

⁷ “[Ukraine Shinko wa ‘Kokuren Kensho to Sohan’ ‘Gyakumodori Dekinai Wakedenai’--- Guterres Jimu Socho” \[UN Secretary-General Guterres: Russian Invasion of Ukraine is ‘Against the \(UN\) Charter’ But ‘Not Irreversible’\]](#), *Yomiuri Shimbun*, February 25, 2022.

⁸ “[Ukraine War: Chernobyl workers’ 12-day ordeal under Russian guard](#),” *BBC News* (in Japanese translation), March 8, 2022.

⁹ Tatsujiro Suzuki, “[Ukraine Shinko to Futatsu no ‘Kaku’ Kiki” \[Russian Invasion of Ukraine and Two ‘Nuclear’ Crises\]](#) *Asahi Shimbun Ronza*, March 22, 2022.

Figure 1: Nuclear Power Plants in Ukraine



Source: Created by the authors based on, inter alia, Japan Atomic Industrial Forum, Inc., “*Sekai no Genshiryoku Hatsuden Kaihatsu Doko*” [Trends in Nuclear Power Development in the World].

Following the Russian seizure of the Chernobyl NPP, IAEA Director General Rafael Mariano Grossi appealed for maximum restraint, stressing that “any armed attack on and threat against nuclear facilities devoted to peaceful purposes constitutes a violation of the principles of the United Nations Charter, international law and the Statute of the Agency.”¹⁰

Meanwhile, the Geneva Conventions, a set of treaties on the protection of prisoners of war (POWs) and civilians not involved in fighting, provide for the protection of the civilian population in Part IV of Protocol I, defining the scope of works and installations subject to protection, which includes nuclear power plants in Article 56 (see Appendix 1 at the end of this report for the text of Article 56). Russia is a signatory to Protocol I Additional to the Geneva Conventions.

The Russian actions also constitute a war crime, which is among the “crimes within the jurisdiction of the Court” as provided for in Article 5 of the Rome Statute of the International Criminal Court (ICC Statute). Although Russia is not party to the ICC Statute, Article 25 stipulates that: “A person who commits a crime within the jurisdiction of the Court shall be individually responsible and liable for punishment in accordance with this Statute.”¹¹ That is, it is institutionally possible for the ICC to investigate international law violations and war crimes committed during the Russian military operation in Ukraine and prosecute President Putin, other government leaders, and commanders. It would be extremely difficult to take them into custody. Nevertheless, the ICC should investigate Russian violations and make efforts to bring charges against them

¹⁰ “IAEA Jimukyokuchō ‘Saidaien no Jisei o’: Ukraina Josei de Seimei” [IAEA Director General Appeals for ‘Maximum Restraint’: Statement on the Situation in Ukraine], *Asahi Shimbun*, February 25, 2022.

¹¹ See Footnote 6.

to the extent possible within its jurisdiction. This would set a precedent for what constitutes a crime against international law, which would in turn prevent the occurrence of similar crimes in the future and lead to greater confidence in international law and rules.

As the largest provider of funding—i.e., assessed and other contributions—to the ICC¹² and being in the unique position of having a deep understanding of the role of the ICC, Japan should provide maximum possible support to the ICC. Having no police force of its own, the ICC inevitably needs to rely on its member states to collect evidence of war crimes and international law violations as well as to conduct investigations.¹³ The United States is not an ICC member and has been uncooperative with the ICC for fear of being accused of crimes committed by US soldiers in Afghanistan or elsewhere,¹⁴ making Japan’s role all the more important.

In this regard, it is to be appreciated that Prime Minister Fumio Kishida announced that Japan will accelerate payment of its assessed contributions to the ICC in a show of its support for the investigation by the ICC prosecutor into alleged war crimes by Russia, stating that Russian acts in Ukraine are “absolutely intolerable war crimes” and that “Russia must be held strictly accountable” for its inhumane acts.¹⁵

At the same time, Japan should take a leading role in identifying shortcomings in existing international treaties including the Geneva Conventions.

As a matter of fact, the scope of nuclear facilities regarded as “works and installations containing dangerous forces” subject to protection under Protocol 1 Additional to the Geneva Conventions is limited to “nuclear electrical generating stations.” Thus, spent nuclear fuel reprocessing facilities and storage facilities—both of which have higher potential risks—are beyond the scope. The IAEA has long been aware of the problem of this clause. At its 53rd session in 2019, the IAEA General Conference issued and endorsed its president’s statement entitled “Prohibition of armed attack or threat of attack against nuclear installations, during operation or under construction,” which recognizes the importance of physical protection of nuclear facilities, noting that “any armed attack on and threat against nuclear facilities devoted to peaceful purposes constitutes a violation of the principles of the United Nations Charter, international law and the Statute of the Agency.”¹⁶

The Russian invasion of Ukraine served as an occasion to raise global awareness of the importance of the physical protection of nuclear facilities. Japan should not miss this opportunity to identify challenges facing the relevant international treaties and conventions, undertake diplomatic efforts to make necessary changes to the international agreements and strengthen their enforcement mechanisms, and seek international consensus on responses to violations.

¹² In fiscal 2019/20, Japan contributed some 3.38 billion yen, the largest amount among the 122 member states, accounting for 15.7% of the ICC’s budget.

¹³ “*Ro no Senso Hanzai: Tsuikyu e Hongoshi*” [Investigation of Russian War Crimes Kicks into Full Gear], *Yomiuri Shimbun*, April 23, 2022.

¹⁴ *Id.*

¹⁵ [“Kokusai Keiji Saibansho e no Buntankin Shiharai Maedaishi: Shusho Hyomei” \[Japan to Accelerate Payment of Assessed Contributions to the ICC: Prime Minister\]](#), *Nihon Keizai Shimbun*, April 8, 2022.

¹⁶ [“Kokusai Genshiryoku Kikan \(IAEA\) Dai 53-kai Sokai no Kekka Gaiyo” \[Summary of the Outcome of the 53rd Session of the IAEA General Conference\]](#), Website of the Ministry of Foreign Affairs, Japan.

Recommendation 2:

The Japanese government should reconsider the current assumptions regarding the physical protection of nuclear facilities in Japan and call on the international community to work together to step up efforts to further strengthen nuclear security.

Although physical protection of nuclear facilities from military attacks is not covered by the IAEA's guidelines for physical protection of nuclear materials, it is necessary to thoroughly examine what lessons can be learned from the Russian military attacks on Ukraine's nuclear power plants. The government needs to examine whether the physical protection regime currently in place is sufficient, engaging various stakeholders—including local governments of host communities—in the process. Particularly, as a country that is home to sensitive nuclear facilities such as those for nuclear fuel reprocessing and in possession of a large amount of nuclear material, Japan should play a leading role in international efforts to further strengthen nuclear security. It should propose steps that would help enhance nuclear security worldwide. For instance, Japan can call for convening a conference of state parties to the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities on a regular basis and requiring state parties to report on their national initiatives undertaken based on a renewed awareness of threats to nuclear facilities. It can also call for the reconvening of the Nuclear Security Summit.

No countries—including Japan—publish their design basis threat (DBT)¹⁷ because, in the context of nuclear security, disclosing information on the physical protection of nuclear facilities is tantamount to giving clues to terrorists. The deployment and mobilization of armed forces are governed by national law.

When we look at rules for the physical protection of nuclear facilities in countries using nuclear energy for civilian purposes, a typical arrangement is that police officers or private security guards specifically permitted to carry weapons are stationed within the premises or kept on standby at nearby locations where they can readily respond to calls for service. Another point these countries generally have in common is that armed forces are called to action when the government declares a state of emergency or special alert (see Appendix 2 for more details on each country's rules).

Prompted by the 2001 terror attacks in the United States, Japan implemented enhanced security measures for nuclear facilities. Anti-Firearms Squads—i.e., prefectural tactical police units equipped with sub-machine guns, rifles, and bulletproof security vehicles—are on guard at nuclear facilities 24 hours a day, while the

¹⁷ According to the IAEA rules for the physical protection of nuclear material and facilities (INFCIRC/225/Rev.4), the term “design basis threat (DBT)” is defined as “the attributes and characteristics of potential insider and/or external adversaries, who might attempt *unauthorized removal* of nuclear material or *sabotage*, against which a physical protection system is designed and evaluated.” The competent authority is responsible for identifying such attributes and characteristics, and nuclear facility operators are required to implement measures based thereon. [Website of the Ministry of Education, Culture, Sports, Science and Technology, Japan](#)

Japan Coast Guard is constantly engaged in surveillance activities. Japan has a two-tiered response system in place to cope with terror attacks. A Special Assault Team (SAT), a police tactical unit equipped with advanced counter-terror capabilities, will be dispatched in the wake of a terror attack and then, if the government declares an emergency response situation or a situation requiring mobilization for public security operations, troops of the Self-Defense Forces will be mobilized.¹⁸ Meanwhile, after the Fukushima Daiichi nuclear accident, Japan strengthened the safeguarding not only of reactor buildings, but also of spent fuel storage and other facilities that could cause a major disaster—such as leakage and spread of radioactive substances—if destroyed.¹⁹

However, the typical practice in Japan is that members of the prefectural Anti-Firearms Unit are assigned in shifts to guard nuclear facilities, with the sole exception of Fukui Prefecture. Being home to 15 nuclear reactors—the largest concentration in Japan—including those at the Ohi Nuclear Power Station operated by Kansai Electric Power Company (KEPCO), the prefecture has a squad dedicated to protecting nuclear facilities. As in other countries, Japan has a two-tiered response system, and troops of the Self-Defense Forces are to be mobilized in the event of a situation that cannot be dealt with by police forces. Also, the police and the Self-Defense Forces have conducted joint exercises under specifically assumed conditions. With regard to responding to a situation beyond the DBT, such as one comparable to the Russian invasion of Ukraine, relevant legislation is already in place.²⁰ However, we must say that not enough consideration has been given to the training required to ensure the operability of the law and what roles should be played respectively by the Self-Defense Forces and the police. Based on these observations, the Study Group specifically proposes that the Japanese government should implement the following measures:

- Deploy squads dedicated to protecting nuclear facilities nationwide drawing on the initiative of the Fukui Prefectural Police and reinforce the physical protection of nuclear facilities by equipping squad members with technical knowledge of those facilities²¹
- Regularly conduct operational training for nuclear power plant operators, police officers, and members

¹⁸ An “emergency response situation” refers to a situation where there occurred an act of killing a large number of people by use of means equivalent to those used in an armed attack or a situation where there is found to be a clear and imminent danger of such an occurrence in the case where such situation is deemed to require an urgent national response. “Mobilization for public security operations” means the mobilization of the Self-Defense Forces by an order of the prime minister to engage in public security operations when public security cannot be maintained by ordinary police forces (Article 78 of the Self-Defense Forces Act).

¹⁹ “[Genshiryoku-kanren Shisetsu ni Taisuru Tero e no Taisaku](#)” [Countering Terror Attacks on Nuclear Facilities], National Police Agency, Japan.

²⁰ The Self-Defense Forces Act provides for the mobilization of the Self-Defense Forces, stipulating that the prime minister may order the mobilization of the Self-Defense Forces when public security cannot be maintained by ordinary police forces. Meanwhile, the Act on Securing the Peace and Independence of Japan and Security of the Nation and its People in an Armed Attack, and a Survival-Threatening Situation (Armed Attack Situation Response Act) provides for an “emergency response situation (*kinkyu taisho jitai*)” defined as a situation where there occurred an act of killing a large number of people by use of means equivalent to those used in an armed attack or a situation where there is found to be a clear and imminent danger of such an occurrence in the case where such situation is deemed to require an urgent national response as well as for an “armed attack situation (*buryoku kogeki jitai*)” as a situation where there occurred an armed attack on Japan from outside or a situation where there is found to be a clear and imminent danger of such an armed attack.

²¹ At a meeting of the House of Councillors Budget Committee on March 14, 2022, Prime Minister Fumio Kishida said his government would consider creating a police unit specializing in guarding nuclear power plants. “[Shusho, Genpatsu Keibi no Zenkoku Tenkai o Kento, Kokuren Kaikaku mo Teiki](#)” [Prime Minister Mulls Deploying Specialized Police Units to Guard Nuclear Power Plants across the Country and Calls for UN Reform], *Nihon Keizai Shimbun*, March 14, 2022.

of the Self-Defense Forces to better prepare them for an occurrence of a situation beyond the DBT

Indeed, there has been an incident in which a group of terrorist-like armed men penetrated into the nerve center of a nuclear facility. On November 8, 2007, a group of four armed men broke into the Pelindaba Nuclear Research Center in South Africa. The raiders, believed to have tried stealing sensitive information on nuclear weapons, made their way into the emergency control center, shooting a security service officer.²² Although Japan has so far not experienced any such incident, the regulatory standards established by the Nuclear Regulation Authority (NRA) in the aftermath of the Fukushima Daiichi disaster include steps to strengthen protection against terror attacks. For instance, utilities operating nuclear power plants are required to establish facilities equipped to withstand specific serious accidents (hereinafter “safeguarded facilities”) that would enable them to continue to operate reactors via remote control even if critical facilities—such as the central control room from which the reactors are operated and controlled—are destroyed.

If those plotting a physical attack from outside actually break into the premises and occupy a nuclear facility, it would have a fatal impact on the safe and sound operation of the facility. In addition, IAEA safeguards would cease to function, posing a threat to the proper management of nuclear material. In fact, after Russian troops seized the Chernobyl and Zaporizhzhia NPPs, the monitoring systems installed at these two sites temporarily stopped sending data to the IAEA.²³ Japan, which is home to nuclear fuel reprocessing facilities and possesses a large amount of plutonium, a sensitive nuclear material, should assume the possibility of attack and seizure of a nuclear facility and establish a truly reliable and workable system with capabilities to physically protect facilities for remote control.

In reality, however, it appears that the importance of nuclear security, including the physical protection of nuclear facilities, is not fully understood in Japan. In September 2020, an employee at TEPCO’s Kashiwazaki-Kariwa Nuclear Power Station was found to have taken another employee’s ID card without asking and used it to enter the central control room, the nerve center of the facility that operates and controls its reactors. It was also found that some of the security facilities at the nuclear power station, such as intruder detection equipment, had been malfunctioning since March 2020, but the situation had long been left unattended, with TEPCO failing to implement effective alternative measures. As a result, the nuclear power station was breaching security in multiple locations, being unable to properly detect unauthorized entries.

Threats to nuclear facilities are not limited to attacks from outside. There are risks of cyberattacks as well as internal threats, i.e., threats posed by insiders such as a malicious employee who obtains a job at a nuclear facility by pretending to be a good citizen in order to steal confidential information or otherwise exploit nuclear material, an act that could facilitate physical attacks from outsiders including terrorists. Indeed, this appears to have been the case with the incident in South Africa, as it is believed that the intrusion was carried

²² Lecture by Isao Itabashi, a Study Group member, at the 5th meeting of the Study Group on Nuclear Non-Proliferation and Nuclear Security, Sasakawa Peace Foundation, on November 15, 2021.

²³ [“Zaporija Genpatsu de Deta Soshin Teishi, Cherunobuiru ni Tsuduki: IAEA” \[Data Transmission from the Zaporizhzhia NPP Halted, Following a Loss of Data from Chernobyl: IAEA\]](#), NHK, March 10, 2022.

out with the assistance of personnel within the facility.²⁴ Also, the case of security breaches at the Kashiwazaki-Kariwa Nuclear Power Station is the kind of incident that could lead to an intrusion by terrorists or other ill-intentioned persons into critical facilities within the site.

In Japan, utilities are required under the current nuclear regulations to examine the trustworthiness of their employees by reviewing their personal information including criminal records, as part of measures against internal threats. This complies with the IAEA's recommendations. However, unlike other countries, Japan does not have a system in which the government takes responsibility for ensuring the proper implementation of these processes in accordance with strict laws and regulations (see Appendix 3).

From the viewpoint of management of sensitive nuclear technologies as well as economic security, more than ever before the private sector needs systems for trustworthiness verification and security clearance. Although Japan has a state secrecy law that is largely comparable to those in other countries, the applicability of the Japanese law, i.e., the Act on Protection of Specially Designated Secrets, is primarily limited to public servants, covering only a fraction of members of the private sector, which may pose an obstacle to technical cooperation and information sharing with other countries in the field of nuclear security in the future.²⁵

Japan should follow in the steps of other countries to institutionalize a security clearance system for the private sector by means of legislation, not by cabinet order, so that it can promote international cooperation to enhance nuclear security and in the management of nuclear material and sensitive nuclear technologies.

In doing so, there are some points that must be kept in mind. First, it is essential to have an oversight mechanism in place to ensure a balance with other needs—i.e., the need to respect human rights and the need to protect privacy—and monitor whether the system is operated properly. This may require defining the checking function of the Diet, the Japanese parliament, and institutionalizing a security clearance system for Diet members. It is also necessary to enhance the existing whistleblowing system, because nuclear security cannot be strengthened simply by establishing a trustworthiness verification system. Under the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (hereinafter the “Nuclear Reactor Regulation Act”), the scope of conduct subject to whistleblowing is limited to violations of this law.²⁶ The system requires significant improvements, such as expanding the scope of reportable matters to include acts and events that could impact nuclear safety and security in the future even when they do not immediately constitute a clear-cut violation and enhancing the protection of whistleblowers to ensure that there will be no retaliation by the organization, such as demotion or firing, for speaking out.²⁷

²⁴ Lecture by Isao Itabashi, a Study Group member, at the 5th meeting of the Study Group on Nuclear Non-Proliferation and Nuclear Security, Sasakawa Peace Foundation, on November 15, 2021.

²⁵ Lecture by Yosuke Naoi, a Study Group member, at the 5th meeting of the Study Group on Nuclear Non-Proliferation and Nuclear Security, Sasakawa Peace Foundation, on November 15, 2021.

²⁶ Article 66, paragraph (1) of the Nuclear Reactor Regulation Act reads as follows: “In the case that there is a fact that any licensee of nuclear energy activity, etc. (excluding operators of a foreign nuclear vessel; hereinafter the same shall apply in this Article) has violated the provisions of this Act or an order pursuant to this Act, any employee of the licensee of nuclear facility, etc. may allege this fact to the Nuclear Regulation Authority.”

²⁷ Lecture by Tatsuo Suzuki, chairman of the Study Group, at the 5th meeting of the Study Group on Nuclear Non-Proliferation and

The kinds of measures described above can be implemented more effectively through international cooperation than by individual countries working on their own. In May 2016, an Amendment to the Convention on the Physical Protection of Nuclear Material, to which 152 countries were signatory, was brought into force. Under the amended convention, renamed the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities, signatory countries are required to implement measures to protect nuclear material and facilities from terrorists and other physical attacks. Japan can make a significant contribution to enhancing nuclear security around the world by calling for, and playing a leading role in, the establishment of a platform for signatory countries to regularly report and review the status of compliance with the convention, following the example of the Nuclear Non-Proliferation Treaty (NPT) Review Conference. At the same time, Japan can also call for reconvening the Nuclear Security Summit as a forum for leaders to engage in face-to-face discussions. The Nuclear Security Summit has not been held since 2016. The Russian military incursion into the Chernobyl and Zaporizhzhia NPPs has sparked concern over the security of nuclear facilities across the world. By hosting a meeting of the Nuclear Security Summit with these events in mind, Japan can provide world leaders with an opportunity to take a first step toward recognizing the need to further amend international rules concerning the protection of nuclear facilities and define penal provisions for violations, thereby helping promote a global nuclear security culture.

Recommendation 3:

In light of the loss of Russian credibility in the international community, it is imperative to explore a new framework for international cooperation in order to ensure the safety of the existing nuclear facilities and secure nuclear fuel supply capabilities. Japan needs to become involved in this international effort by identifying areas where it can contribute.

As a result of its invasion of Ukraine and the accompanying attacks on nuclear power plants, Russia, a leading nuclear energy player holding a large portion of the global market, has lost its credibility in the international community. Western countries that have led the world in the civilian use of nuclear energy need to explore a new framework for international cooperation to replace Russia as a major supplier of enriched uranium and a provider of maintenance services for its exported nuclear facilities.

Russia has been providing unparalleled services relating to the civilian use of nuclear energy, covering all relevant technologies ranging from uranium enrichment for nuclear fuel production to the take-back and reprocessing of spent nuclear fuel. Currently, a total of 80 Russian-made nuclear reactors are in service in Russia and elsewhere. Accounting for some 20% of the reactors operated worldwide, Russia holds a dominant share in the international nuclear energy market.²⁸ Despite the Chernobyl nuclear accident in 1986 and the collapse of the Soviet Union in 1991, nuclear technology was taken over and has been maintained by the Russian Federation.²⁹

Rosatom, a state corporation established in 2007, is the backbone of the Russian nuclear energy industry. The company offers a spent fuel take-back or nuclear fuel leasing arrangement in exporting nuclear power plants. This helped boost Russian presence in the international market, because importing countries find the arrangement advantageous in eliminating the need to worry about amassing hard-to-dispose spent nuclear fuel.

In uranium enrichment (i.e., production of low enriched uranium: LEU), which is essential to nuclear fuel production, TVEL Fuel Company, a subsidiary of Rosatom, holds 45% of the world market (see Figure 1).

²⁸ Lecture by Takuya Hattori, former president of Japan Atomic Industrial Forum, Inc. (JAIF), at the 8th meeting of the Study Group on Nuclear Non-Proliferation and Nuclear Security, Sasakawa Peace Foundation, on April 18, 2022.

²⁹ Lecture by Takuya Hattori, former president of JAIF, at Sasakawa Peace Foundation on October 30, 2020.

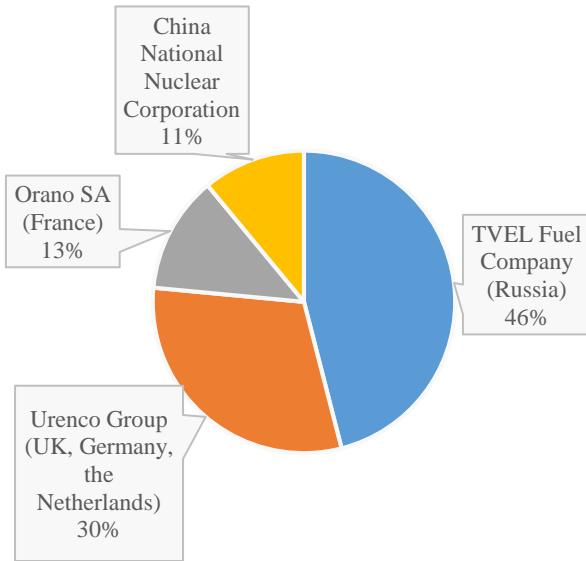


Figure 1: Global Enriched Uranium Market Share by Company (2020)

Source: Created by the authors based on “[Uran Noshuku Gyokai no Sekai Shijo Shea no Bunseki \[Analysis of Global Market Shares of Uranium Enrichment Companies\]](#),” (deallab), etc.

Until the first half of the 2000s, the Urenco Group, a British-German-Dutch consortium, was the leader in the global uranium enrichment market. Against this backdrop, TVEL Fuel Company managed to drastically reduce the cost of uranium enrichment by developing a new gas centrifuge, which led to a rapid expansion of its share in the global market from the 2010s onward.³⁰

However, by invading Ukraine and attacking its nuclear facilities, Russia may have lost more than its credibility in the international community. With its economy ravaged by Western sanctions, Russia’s influence in the field of nuclear energy will likely decline going forward. In fact, Sweden stopped sourcing LEU from Russia, while in the United States, a bill banning LEU imports from Russia was introduced to the Senate.³¹ As for nuclear fuel, which is fabricated from LEU for insertion into a reactor, Ukraine was already sourcing fuel from the United States at the time of the invasion, having switched from Russian-made to US-made fuel following a deterioration in its relationship with Russia. Meanwhile, in the wake of the Russian invasion of Ukraine, the Czech Republic followed suit, announcing the selection of an American company as the supplier of fuel for Russia-made reactors in the country.³² For many years after World War II, the United States and other Western countries—including France, Japan, Germany, the United Kingdom, and South Korea—led the world in civilian use of nuclear energy. They should assess demand in countries considering a switch from Russia. They should also start listing areas in which they can cooperate, to

³⁰ “[Kaigai Uran Noshuku Kigyo Doko](#)” [Trends in Overseas Enriched Uranium Suppliers], Japan Atomic Energy Agency (JAEA), *Genshiryoku Kaigai Topikkusu*, March 14, 2013.

³¹ Lecture by Takuya Hattori, former president of JAIF, at the 8th meeting of the Study Group on Nuclear Non-Proliferation and Nuclear Security, Sasakawa Peace Foundation, on April 18, 2022.

³² “[Westinghouse va approvisionner en combustible les réacteurs VVER de Temelin en République tchèque](#)” [Westinghouse to Supply Fuel for Use in VVER Reactors at the Temelin NPP in the Czech Republic], Société française d’énergie nucléaire, April 19, 2022.

determine the extent to which they can substitute for Russia, for instance, in supplying enriched uranium and providing maintenance services for nuclear power plants exported by Russia.

Nevertheless, Russia is a formidable nuclear energy superpower and its capacity to supply nuclear fuel, facilities, and related parts and components are among the largest in the world. Although Western countries are imposing severe sanctions on Russia, such as banning imports of natural resources, Rosatom is not subject to these measures. Also, no countries—including Japan—have terminated their bilateral nuclear cooperation agreements with Russia. There are certain areas where Russian initiatives and training can be referenced, for instance, in strengthening nuclear security as noted in Recommendation 2,³³ and Russia has been playing no small role in nuclear non-proliferation, including the Joint Comprehensive Plan of Action (JCPOA). Thus it is a rational policy to maintain a degree of cooperation with Russia in the field of nuclear energy. However, care must be taken to ensure that the maintenance of such limited cooperation with Russia does not lead to tolerance by the international community of Russian barbarism.

Given these circumstances, Japan and other Western countries should start discussing alternative supply arrangements for LEU, nuclear facilities, and relevant parts and components that have been procured from Russia. They also need to reconsider their nuclear cooperation agreements with Russia.

As for the supply of LEU, an IAEA-established mechanism called the LEU Bank is already in place.³⁴ The IAEA LEU Bank is a storage facility for LEU suited to making fuel for a typical light water reactor, designed to serve as last resort for IAEA member states in the event of a disruption in nuclear fuel supply due to political or other contingencies. The IAEA decided on its establishment in 2010, and Kazakhstan offered to become its host in 2011. The LEU Bank became operational on October 17, 2019, with the arrival of the first shipment of LEU from Orano SA, a French nuclear company with the third largest share of the global enriched uranium market.³⁵

In 2007, Russia established the International Uranium Enrichment Center (IUEC), including a 120-ton fuel bank in Angarsk, and Ukraine was a shareholder. Though designed to fulfill the same functions as the IAEA LEU Bank, the Russian fuel bank has lost its credibility as a nuclear fuel supply agency because of the Russian invasion of Ukraine. However, the reserve capacity of the LEU Bank in Kazakhstan is only 90 tons, just enough to run a 1,000-megawatt reactor. Given this situation, it is considered that establishing LEU Banks in various locations will lead to securing a stable supply of LEU internationally. Since Japan has uranium enrichment technology, it is worthwhile exploring the possibility of hosting such a bank.

Japanese companies should have room to cooperate in the supply of parts and components for nuclear power plants exported from Russia, because the percentage of domestically produced parts and components exceeds 90% in many of the nuclear power plants brought into operation in Japan during and after the 1970s. Hence

³³ *Id.*

³⁴ *Id.*

³⁵ “[Teinoshuku Uran Bichiku Banku Shido, Genpatsu Nenryo no Antei Kyokyū ni Koken](#)” [LEU Bank Goes into Operation to Contribute to a Stable Supply of Nuclear Fuel], JETRO Biznesu Tanshin, October 24, 2019.

Japan has the advantage of a well-established supply chain for procuring numerous different types of parts and components, totaling as many as 10 million.³⁶ Some Japanese companies have won contracts from overseas customers and exported containment vessels and cooling pumps in the past.

The Japanese government has said it will maintain its nuclear cooperation agreement with Russia for the time being.³⁷ However, it should ponder how such a bilateral agreement should be, for instance in dealing with a situation where one party violates international conventions and/or IAEA General Conference resolutions on the physical protection of nuclear facilities.

³⁶ “*Genpatsu Buhin no Yushutsu Ato-oshi Kento, Keisansho, ‘Hatsudensho Zentai’ o Tenkan: Nonyu ya Kikaku Shutoku o Shien*” [METI Mulls Backing Exports of Parts and Components for Nuclear Power Plants in a Shift from the ‘Whole Plant Export’ Strategy: Aiming to Maintain the Domestic Nuclear Industry by Supporting Exporters in Delivering Products and Acquiring Certificates], *Nihon Keizai Shimbun*, April 7, 2022.

³⁷ “*Nichi-Ro Genshiryoku Kyotei wa Iji: Gaisho Minaoshi Kangaezu*” [Japan-Russia Nuclear Agreement to Stay: Foreign Minister ‘Not Thinking About Reconsidering It’], *Nihon Keizai Shimbun*, March 4, 2022.

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10. “[Teinoshuku Uran Bichiku Banku Shido, Genpatsu Nenryo no Antei Kyokyuu ni Koken](#)” [LEU Bank Goes into Operation to Contribute to a Stable Supply of Nuclear Fuel], *JETRO Bizinesu Tanshin*, October 24, 2019
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Appendices

Article 56 of Protocol I Additional to the Geneva Conventions

Article 56 – Protection of works and installations containing dangerous forces

1. Works or installations containing dangerous forces, namely dams, dykes and nuclear electrical generating stations, shall not be made the object of attack, even where these objects are military objectives, if such attack may cause the release of dangerous forces and consequent severe losses among the civilian population. Other military objectives located at or in the vicinity of these works or installations shall not be made the object of attack if such attack may cause the release of dangerous forces from the works or installations and consequent severe losses among the civilian population.
2. The special protection against attack provided by paragraph 1 shall cease:
 - a. for a dam or a dyke only if it is used for other than its normal function and in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support;
 - b. for a nuclear electrical generating station only if it provides electric power in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support;
 - c. for other military objectives located at or in the vicinity of these works or installations only if they are used in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support.
3. In all cases, the civilian population and individual civilians shall remain entitled to all the protection accorded them by international law, including the protection of the precautionary measures provided for in Article 57. If the protection ceases and any of the works, installations or military objectives mentioned in paragraph 1 is attacked, all practical precautions shall be taken to avoid the release of the dangerous forces.
4. It is prohibited to make any of the works, installations or military objectives mentioned in paragraph 1 the object of reprisals.
5. The Parties to the conflict shall endeavour to avoid locating any military objectives in the vicinity of the works or installations mentioned in paragraph 1. Nevertheless, installations erected for the sole purpose of defending the protected works or installations from attack are permissible and shall not themselves be made the object of attack, provided that they are not used in hostilities except for defensive actions necessary to respond to attacks against the protected works or installations and that their armament is limited to weapons capable only of repelling hostile action against the protected works or installations.
6. The High Contracting Parties and the Parties to the conflict are urged to conclude further agreements among themselves to provide additional protection for objects containing dangerous forces.
7. In order to facilitate the identification of the objects protected by this article, the Parties to the conflict may mark them with a special sign consisting of a group of three bright orange circles placed on the same axis, as specified in Article 16 of Annex I to this Protocol [Article 17 of Amended Annex]. The absence of such marking in no way relieves any Party to the conflict of its obligations under this Article.³⁸

³⁸ [Protocol I Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts](#). Ministry of Foreign Affairs (MOFA), Japan.

Overseas Practices in the Physical Protection of Nuclear Facilities

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May 2022

The September 11, 2001, terror attacks in the United States prompted countries around the world to strengthen physical protection of nuclear facilities by introducing new legislation and creating new police or other security squads. Only in Russia and a few other countries, military forces are directly responsible for physical protection of nuclear facilities. Most countries have legislation providing for mobilizing military forces in the event of an emergency with the task of physical protection carried out primarily by private security companies or police. What follows provides an overview of practices mainly in the United States and European countries using nuclear energy for civilian use.

United States

In the United States, the Nuclear Regulatory Commission (NRC) is responsible for the security of nuclear facilities for civilian use, whereas those for military use are under the jurisdiction of the National Nuclear Security Administration (NNSA). Of those, nuclear power plants and other civilian-use facilities are protected by armed private security guards, with support provided by state police. Security guards for nuclear facilities are required to complete 200 hours of training, such as in the use of automatic rifles and the driving of armed vehicles, before deployment.³⁹

United Kingdom

As part of measures implemented to strengthen the physical protection of nuclear facilities in response to the 9/11 attacks in the United States, the UK government established the Civil Nuclear Constabulary (CNC) within the Civil Nuclear Police Authority (CNPA) in 2005. Consisting of 1,500 members, the CNC is a special police force dedicated to physically protecting nuclear facilities and material from terror attacks. CNC units are stationed in England, Scotland, and Wales where nuclear facilities such as nuclear power plants are present.⁴⁰ There is a possibility that the CNC will be further reinforced as the UK government has announced its plan to add eight new reactors by 2030.⁴¹

France

In 2009, the National Gendarmerie and EDF (*Électricité de France*) agreed to establish the Specialized

³⁹ “[Genshiryoku o Tou \(II\) Tero Kogeki to Taisaku](#)” [Questioning Nuclear Energy (11): Terror Attacks and Countermeasures], *Chugoku Shimbun*, March 23, 2003.

⁴⁰ “[Civil Nuclear Constabulary](#),” Website of the UK government.

⁴¹ “[Ei, Genshiro 8-ki o 30-nen made ni Kensetsu, Dengen no Tayoka Isogu](#)” [UK to Construct Eight New Nuclear Reactors by 2030, Rushing to Diversify Power Sources], *Nihon Keizai Shimbun*, April 8, 2022.

Gendarmerie Protection Platoons (PSPG: *Pelotons Spécialisés de Protection de la Gendarmerie*) and put them into action in a move to strengthen counterterrorism measures. They are deployed to guard nuclear facilities owned by EDF and the Atomic Energy Commission (CEA: *Commissariat à l'énergie atomique*). As of 2017, a total of 21 platoons were deployed across the country, with each platoon consisting of 40 or more gendarmes.⁴² Although its primary responsibility is law enforcement in municipalities, the French gendarmerie is part of the French Armed Forces. Thus, once the government declares a state of special alert, some of its physical protection responsibilities are transferred to the Armed Forces. The nuclear reprocessing plant at La Hague in northern France has surveillance radars to constantly monitor the surrounding areas. In the wake of the 9/11 terror attacks in the United States in 2001, the French government declared a state of special alert and temporarily installed surface-to-air missiles at the site.

Belgium

Belgium's physical protection regime for nuclear facilities is similar to the one in France. Police officers are stationed on site to guard nuclear facilities in ordinary times, and military forces can be dispatched by a government order to raise the level of alert. On March 22, 2016, terror attacks hit the capital city of Brussels in multiple locations including Brussels Airport, killing 32 people. It was found that the terrorist group responsible for the bombings had initially planned to attack a nuclear power plant, prompting the government to tighten security and dispatch military forces to nuclear facilities.⁴³

Russia

Russia is one of few countries with military forces engaged in the physical protection of nuclear facilities even in ordinary times. The Russian nuclear industry is controlled by the state corporation Rosatom and all nuclear power plants are safeguarded jointly by Rosatom and the Russian military forces.⁴⁴

⁴² “*Les Pelotons Spécialisés de Protection de la Gendarmerie (PSPG)*” [Specialized Gendarmerie Protection Platoons (PSPG)], Website of the National Police of France.

⁴³ “*Berugi: Tero o Ukete Genshiryoku no Keikai Taisei o Kyoka*” [Belgium: Security Tightened at Nuclear Facilities following the Terror Attacks], Website of the Federation of Electric Power Companies of Japan (FEPC), April 4, 2016.

⁴⁴ “*Protection of Nuclear Materials and Facilities*,” Website (in English) of Rosatom.

Overseas Practices in Measures against Insider Threats and Security Clearance Systems

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Major countries using nuclear energy for civilian purposes, such as the United States, the United Kingdom, and France, have a comprehensive trustworthiness verification system established on the national level to prevent acts of terrorism in society and safeguard national security. Such systems are mainly targeted at the defense industry and industries in advanced technology domains such as artificial intelligence (AI) and cyber technologies. These countries also have in place a trustworthiness verification system applicable to those in the nuclear energy sector, because if nuclear material were stolen by a non-state actor and used for nuclear terrorism, it could have devastating consequences on society and the environment.

United States

Operators of plutonium-handling facilities under the jurisdiction of the Nuclear Regulatory Commission (NRC), such as nuclear power plants and nuclear fuel reprocessing facilities, are required to have employees with access to those facilities submit their personal information and to perform background checks on those individuals, including a search of criminal records, a review of credit history, and an assessment of characteristics. The criminal record search involves operators making inquiries to the Federal Bureau of Investigation (FBI).⁴⁵

United Kingdom

The United Kingdom has a comprehensive trustworthiness verification system established on the national level. Individuals seeking to access information classified as state secret, engage in public security jobs, or work in fields such as aviation security are required to undergo trustworthiness checks. Likewise, in the nuclear energy sector, those with access to nuclear facilities, nuclear material, and sensitive information are subject to background checks—i.e., a search of criminal records and a review of credit history—with the government responsible for conducting personal interviews and interviews with their previous employers.

France

In making an administrative decision on employment, appointment, approval, consent, or qualification with regard to (1) public jobs involved in the performance of tasks related to sovereignty, (2) public or private sector jobs related to security or defense, and (3) jobs involving work near access control areas, use of

⁴⁵ Lecture by Isao Itabashi at the 5th meeting of the Study Group on Nuclear Non-Proliferation and Nuclear Security on November 15, 2021.

hazardous material or products, etc., the National Police and the National Gendarmerie perform trustworthiness checks on individuals concerned using criminal investigation records and other information to determine their suitability to the tasks, pursuant to law No. 95-73 of 21 January 1995 on guidance and planning related to security (*Loi no. 95-73 d'orientation et de programmation relative à la sécurité*). The same law applies to jobs in the nuclear energy sector.

Germany

Pursuant to the Security Screening Act (*Sicherheitsüberprüfungsgesetz*), the trustworthiness of individuals engaging in jobs prone to security breaches or those working at critical defense facilities is checked through government inquiries into their personal information, including criminal records and records of administrative punishment. Likewise, in the nuclear energy sector, pursuant to the Nuclear Energy Act (*Atomgesetz*) the government is responsible for performing trustworthiness checks on individuals working at nuclear facilities and those involved in transport of nuclear material, although the country maintains its policy to shut down all of its nuclear power plants by the end of 2022.⁴⁶

⁴⁶ See "[Kaigai ni oite Jisshi Sarete Iru Shinyosei Kakunin ni tsuite](#)" [Overseas Practices of Trustworthiness Verification], Website of the Ministry of Education, Culture, Sports, Science and Technology, Japan.

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