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U.S.-Japan Nuclear Cooperation

The Significance of July 2018

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Abstract

In July 2018, the U.S.-Japan Agreement for Cooperation Between the Government of Japan and the Government of the United States on Peaceful Uses of Nuclear Energy will extend automatically. Its extension means Japan can receive U.S.-origin special nuclear material, retain advance consent for reprocessing, and is bound by the non-proliferation criteria and practices set out in the agreement. It also means U.S.-Japan nuclear technology exchanges and collaborative scientific research can continue. Such agreements, known as “Section 123” Agreements for the section of the U.S. Atomic Energy Act that specifies necessary steps for engaging in international nuclear cooperation, including nine criteria non-nuclear weapon states such as Japan must meet to ensure appropriate non-proliferation safeguards are in place.¹

¹ See Paul K. Kerr and Mary Beth D. Nikitin, *Nuclear Cooperation with Other Nations, A Primer*, Congressional Research Service, December 27, 2016, for an explanation of 123 Agreements and their non-proliferation safeguards.

Both the U.S. and Japanese governments, after internal debates, do not perceive a need to renegotiate the Agreement's terms, including its most controversial provision, advance automatic approval for Japan's reprocessing of U.S.-origin nuclear material. The United States sees Japan as an important partner in nuclear energy, and a reliable and meticulous adherent to nonproliferation standards and practices. Japan sees the United States as an essential partner in research and nuclear exports. Japan also has long held that its ability to reprocess nuclear fuel for use in nuclear power plants is essential to its energy security.

The decision, however, was not a foregone conclusion given the heated debate in Japan surrounding the use of nuclear power after the March 2011 Fukushima Daiichi accident. There also is widespread concern in the United States and Japan over the continued buildup of Japan's plutonium stocks, especially with most of its reactors offline and the completion of the Rokkasho Nuclear Fuel Reprocessing Facility now rescheduled for 2021, the 24th time Japan has postponed its completion.²

Partners in Nuclear Energy

The United States and Japan are the world's longest-standing partners in the field of civil nuclear energy. Japan and the United States signed their first nuclear agreement, the U.S.-Japan Nuclear Research Agreement, in 1955. The Japan Atomic Energy Commission published its first long-term plan, the "Atomic Energy Development and Utility Long-Term Plan," in 1956 that included support for reprocessing and the development of breeder reactors.³ Japan was the first country to join President Eisenhower's Atoms for Peace Program. U.S. companies sold billions of dollars of equipment, technology, and fuel to Japan while Japan made the largest foreign contribution, at least \$150 million in the 1960s, to U.S. nuclear R&D programs and paid substantial license fees to the U.S. Atomic Energy Commission and its successors for nuclear fuel services.

Bilateral cooperation expanded during the late 1960s and 1970s as Japan's first wave of commercial nuclear power reactors came online. In 1968, the two countries signed the Agreement for Cooperation between the Government of Japan and the Government of the United States for Cooperation Concerning Peaceful Uses of Nuclear Energy, which was amended and extended in 1988 for thirty years, and which will extend automatically in July 2018. There also has been close cooperation in multilateral civil nuclear and nonproliferation initiatives and in scientific research that continues to the present day.

Reprocessing Issue

Why is Japan the only non-nuclear weapon country to possess full-scale facilities, including those for spent fuel reprocessing? The answer lies at the heart of Japan's energy policy. Japan for over a century has sought to compensate for geographic and resource vulnerabilities while supporting economic growth. More than any other

² For a full explanation of the plutonium issue and the domestic Japanese politics surrounding it, see James Action, *Wagging the Plutonium Dog*, Carnegie Endowment for International Peace, 2015.

³ The U.S. Nuclear Regulatory Commission defines a breeder reactor as "A reactor that produces more nuclear fuel than it consumes. A fertile material, such as uranium-238, when bombarded by neutrons, is transformed into a fissile material, such as plutonium-239, which can be used as fuel." See <https://www.nrc.gov/reading-rm/basic-ref/glossary/breeder.html>.

major country, Japan's actions have centered on lowering risk, maintaining security, and safeguarding an uninterrupted supply.

Since Japan's Atomic Energy Commission released its first long-term nuclear energy plan in 1956, Japan has pursued a closed nuclear fuel cycle policy in which spent fuel from nuclear power plants is reprocessed to extract plutonium for reuse as fuel for its nuclear power plants. Hence, it sought to use a potential energy source that it would possess – spent nuclear fuel – that it determined could, once reprocessing was perfected, cut back on its need to import the fuels needed to power its economic growth. It also perceived that there could eventually be a shortage of uranium for its nuclear reactors. The oil crises of the 1970s reinforced the idea that reprocessing could contribute positively to Japan's energy situation. This rationale continues to the present day. In October 2017, the Japan Atomic Energy Commission (JAEC) began its report, "Utilization of Plutonium," by stating:

A stable supply of energy is indispensable for wholesome and cultured living of the Japanese people. Japan is poor in energy resources, and relies almost entirely on foreign imports for all fossil fuels such as coal, crude oil, and natural gas.⁴

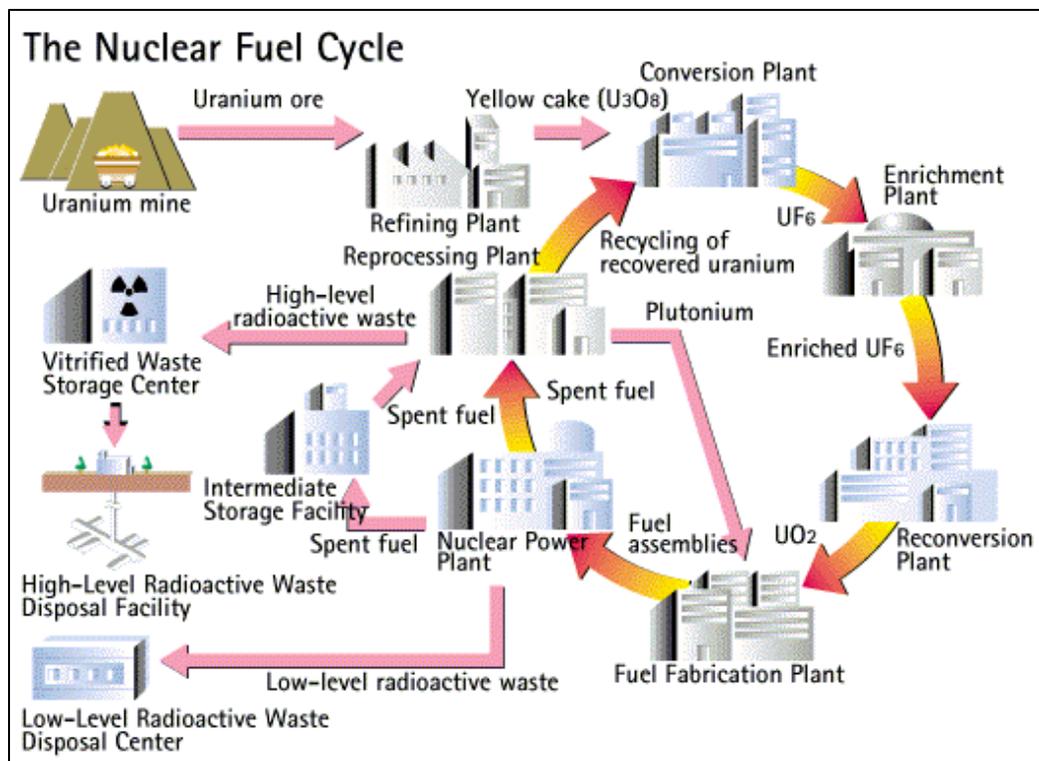
The same report reiterates why Japan prioritized reprocessing:

Since Japan is poor in energy resources and reserves of uranium were considered finite, Japan has adopted, from the beginning of nuclear energy use, a nuclear fuel cycle policy that uses plutonium separated from spent nuclear fuel.⁵

While Japan's rationale still is very much driving its nuclear energy policy, whether or not it is still a viable argument for reprocessing is the subject of much debate. It is a part of Japan's latest energy conundrum – what to do about nuclear energy, including reprocessing, in the aftermath of the Great East Earthquake and Tsunami and the resulting accident at the Fukushima Daiichi nuclear power plant.

⁴ Japan Atomic Energy Commission, *Utilization of Plutonium*, page 1, at http://www.aec.go.jp/jicst/NC/about/kettei/kettei171003_e.pdf.

⁵ *Ibid*, page 2.



Source: Japan Federation of Electric Power Companies

How is Japan one of the only countries with which the United States has an agreement that includes automatic advance consent for reprocessing of U.S. supplied nuclear fuel? Prior to 1988, the United States gave Japan permission to reprocess fuel in the United Kingdom and France on a case-by-case basis. According to declassified papers analyzed and released by the George Washington University's National Security Archive, Japan repeatedly appealed to the United States for advance consent to utilize its spent fuel for reactor experiments in the late 1970s.⁶ Japan argued for its right of self-sufficiency. Many nuclear scientists at the time, not just in Japan, believed breeder reactors fueled with plutonium were the future of the nuclear power industry. Japan was in the process of building a facility at Tokai Mura to reprocess U.S. supplied fuel. (Tokai Mura ceased operation in 2007 and the Japan Atomic Energy Agency announced its permanent closure in September 2014. The Rokkasho Nuclear Fuel Reprocessing Facility under construction since 1993 is its replacement.)

At that time, others, notably U.S. President Carter, worried about the political, security, and environmental hazards of storing and transporting plutonium and were inclined not to give Japan advance reprocessing authority.⁷ President Carter termed reprocessing needless and economically useless. He banned commercial reprocessing in the United States in 1977, preferring to bury its spent fuel. Importantly, neither he nor many others in the United States saw reprocessing as essential to U.S. energy security. Japan, as well as France and Great Britain, did not agree. Ultimately, President Carter agreed to allow Tokai Mura to move forward. President Reagan and Prime Minister Nakasone then agreed to advance consent for Japan to reprocess and signed

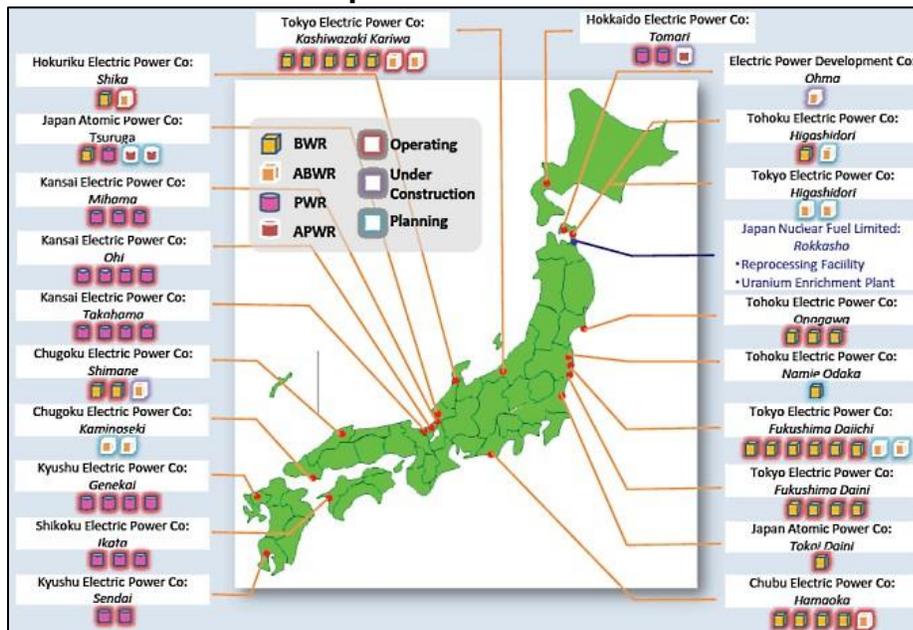
⁶ For more information on the events of this time period, see William Burr, ed., *Japan Plutonium Overhang Origins and Dangers Debated by U.S. Officials*, June 8, 1917, Briefing Book #597, at <https://nsarchive.gwu.edu/briefing-book/nuclear-vault/2017-06-08/japan-plutonium-overhang-origins-dangers-debated-us-officials>.

⁷ *Ibid.*

the landmark 1988 U.S.-Japan Agreement for Cooperation Between the Government of Japan and the Government of the United States on Peaceful Uses of Nuclear Energy Agreement.

What is the current situation? Japan has about 47 tons of separated plutonium onshore and stored in France and Great Britain. It also has restarted only six commercial nuclear plants compared to the 54 operational pre-2011 so it is unclear how soon it could use all the plutonium it already has stored or reach its 2030 goal for nuclear of 20 to 22 percent. At the same time, Aomori Prefecture is economically tied to the success of Rokkasho, and thus reprocessing. Most important, Japan continues to have deeply entrenched energy security concerns. Hence, Japan's current nuclear energy, and reprocessing, conundrum.

Nuclear Power Plants in Japan



Source: World Nuclear Association

Next Steps in the U.S. Japan Civil Nuclear

While reprocessing is certainly the elephant in the room in discussions of the U.S.-Japan 123 Agreement, one could argue the real elephant is Japan's continuing energy security anxieties. Japanese policymakers still state that the main reason for reprocessing is energy security and the efficient use of scarce resources.⁸ The validity of this orthodoxy for the reprocessing issue can be, and is, debated. Often, in addition to proliferation concerns, critics cite reprocessing's high cost as one reason to abandon it but Japan has demonstrated that energy security and stability is more important to it than cost alone. The need for Japan to maintain a civil nuclear energy industry also can be, and is, debated, but it is difficult to see how Japan without any nuclear energy can meet its climate change and energy security goals.

Japan itself needs to decide its next steps on the reprocessing question and plutonium management as well as on civil nuclear energy. There are steps, however, that the United States and Japan can take together to ease Japan's energy security anxiety and reinforce their long-standing energy partnership. These steps are especially important after the 2011 Fukushima accident.

First, U.S.-Japan nuclear technology exchanges and collaborative scientific research should continue and expand. The United States and Japan should invigorate the cooperation begun under the U.S.-Japan Bilateral Commission on Civil Nuclear Cooperation that covered nuclear security, civil nuclear energy research and development, safety and regulatory issues, emergency management, and decommissioning and environmental management. Specific collaboration could include research on alternative means of plutonium disposal,⁹ issues related to the cleanup and decommissioning of Fukushima Daiichi and other reactors, and on advanced fast reactors and small modular reactors that could be more efficient, proliferation resistant and safer.¹⁰ The nuclear industry and research institutes in both countries need to innovate to move forward.

Second, Japan and the United States must continue to work together multilaterally to ensure strong nuclear safety and security. There is a critical linkage between security and nuclear governance, and a strong stakeholder community that ensures existing norms are not compromised.¹¹ The Global Nexus Initiative's policy recommendations conclude that achieving these objectives will be easier and more effective if countries such as the United States and Japan maintain active nuclear programs and continue active engagement with international partners on technology and regulatory development.

Third, the United States and Japan should continue to work together bilaterally and multilaterally to ease energy security concerns. Neither country is self-sufficient or secure enough to become complacent even given the growing U.S.

⁸ For example, see statements in the transcript published by the Citizens' Nuclear Information Center of Session 2 on Japan's Reprocessing Policy and Nuclear Proliferation from the International Conference on the US-Japan Nuclear Cooperation Agreement and Japan's Plutonium Policy held 23-24 February 2017 in Tokyo, Japan.

⁹ Op Cit., James Action, *Wagging the Plutonium Dog*.

¹⁰ Sasakawa Peace Foundation, Technical Feasibility of an Integral Fast Reactor (IFR) as a Future Option for Fast Reactor Cycle, 2016 at <https://spfusa.org/research/technical-feasibility-integral-fast-reactor-ifr-future-option-fast-reactor-cycles/>.

¹¹ Global Nexus Initiative, *Nuclear Power for the Next Century: Addressing Energy, Security and Climate Challenges, 2017* at <https://www.nei.org/CorporateSite/media/filefolder/resources/reports-and-briefs/global-nexus-initiative-nuclear-power-next-generation-2017.pdf>.

presence in oil and gas markets, and cost reductions in renewable energy and energy storage technologies. Continued diversification in both types of energy and sources of energy is important. Climate change and the lack of the existing energy infrastructure's resilience is another threat to energy security. Routine cooperation by the U.S. and Japanese governments and companies needs to continue as well as leadership in international organizations such as the International Energy Agency and the Asia Pacific Economic Cooperation forum.

For the extension of the U.S.-Japan Agreement for Cooperation Between the Government of Japan and the Government of the United States on Peaceful Uses of Nuclear Energy to be meaningful, the two countries need to develop and successfully implement new or expanded joint activities. If not, there is a risk, however unlikely, that one or the other side will invoke the clause to cancel or renegotiate with six months written notice.

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