Japan's Efforts toward Making the Peaceful Use of Nuclear Energy Compatible with Non-proliferation

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Good morning Thank you for the kind introduction. I am Yumi Akimoto, Chairman of the Committee on Energy & Resources of Nippon Keidanren, or Japan Business Federation. I also serve as Chief Executive Emeritus for Mitsubishi Materials Corporation.

Today, first, I will attempt to give an overview of Japan's nuclear energy policy. Second, I will touch on Japan's efforts toward ensuring transparency and confidence in promoting the peaceful use of nuclear energy. Third, I will focus on recently highlighted topics concerning nuclear non-proliferation, centering around the issues of assuring nuclear fuel supply and the Global Nuclear Energy Partnership (GNEP) initiated by the US and their expectations and challenges. My fourth topic will be our expectations for cooperation with India on nuclear energy, and the challenges to address in relation to non-proliferation. Finally, I will summarize my main points.

(1) Overview of Japan's nuclear energy policy

Regarding the first theme of Japan's nuclear energy policy, the "Framework for Nuclear Energy Policy" was created in October 2005 by the Atomic Energy Commission and set by the Cabinet as the new framework replacing the previous "Long-Term Program for Research, Development and Utilization of Nuclear Energy". I will first talk about the policy of Japan based on the provisions of the Framework.

Japan has only 4 % energy self-sufficiency, the lowest among the major industrialized countries, and must rely on overseas energy resources for most of its energy needs. Moreover, since Japan is an island nation facing the difficulty of sharing energy with neighboring countries, it is essential for the country to maximize its efforts in energy saving and secure stable and reliable energy sources.

Additionally, the Kyoto Protocol, addressing one of the most serious environmental issues we face today—that of global warming—came into effect in February 2005, with Japan pledging to reduce its annual total emission of greenhouse gases by 6% on average from 2008 to 2012, in comparison with the level in 1990. Toward this end, it is necessary for Japan to maximize its use of energy sources with low levels of carbon dioxide emissions.

In these conditions, nuclear power generation can be counted upon as an effective means of ensuring a long-term, stable energy supply, and of contributing to the countermeasures against global warming. The reasons for this are that no carbon dioxide is emitted in the process of power generation; radioactive waste can be disposed of without any significant effects on our daily environment; uranium resources reside in countries with relatively stable political situations; it is possible to further improve the stability of the supply through the recycling of nuclear fuels; and, finally, realizing a recycling system with fast breeder reactors will drastically improve the effective use of resources.

Thus, the basic energy policy of Japan involves promoting energy conservation and utilizing as much as possible new energy sources and nuclear energy by taking advantage of their characteristic features, and as a result, adopting the "optimum energy supply mix."

More specifically, Japan has positioned nuclear power generation as its key source of electricity, ensuring a stable energy supply and contributing to the countermeasures against global warming, with the goal of having nuclear energy account for more than 30 to 40% of Japan's total electrical production even after the year 2030.

For resource-poor Japan with its 4% energy self-sufficiency, it is very important to raise the

stability of supply through reprocessing of spent fuel and recycling of the uranium and plutonium that are recovered from spent fuel and that are reusable as fuel. To this end, active tests using real spent fuel are currently being carried out at the Rokkasho reprocessing plant, with the aim of starting plant operations in 2007. Also currently underway is a plan for a MOX fuel fabrication plant with the goal of starting operations in 2012.

When the fast breeder reactor cycle is attained, it will be possible to use as a fuel even unfissionable uranium-238, significantly raising the efficiency of resource utilization and thus securing a stable energy supply for a very long period—for thousands of years, in fact. In addition, by using long-lived nuclides called minor actinides as fuel, it becomes possible to reduce the level of radioactivity that persists for a long period in high-level radioactive waste, which is important from the viewpoint of reducing the environmental burden.

Considering fast breeder reactor operations in this light, we are currently promoting restarting operations at Monju, the prototype fast breeder reactor, with the goal of introducing commercial fast breeder reactors from around the year 2050.

The fuel recycling policy was introduced as a result of the Atomic Energy Commission's reassessment of the ideal nuclear fuel cycle policy in Japan, in view of delays in putting plutonium to use at light-water reactors, operations at the Rokkasho reprocessing plant, and the development of fast breeder reactors.

In particular, the following four scenarios have been envisioned regarding how to deal with spent fuel from now on.

Scenario 1: Spent fuel is reprocessed after storage for an appropriate period of time.

Scenario 2: Spent fuel is reprocessed and direct disposal is adopted for the amount exceeding reprocessing capacity.

Scenario 3: Spent fuel is directly disposed of.

Scenario 4: All spent fuel is stored for the time being, and at some point in the future, reprocessing or direct disposal is chosen.

For each of these scenarios, a comprehensive assessment has been conducted by taking into account the 10 viewpoints of (1) safety, (2) technical feasibility, (3) economic viability, (4) energy security, (5) environmental protection, (6) nuclear non-proliferation, (7) international trends, (8) issues resulting from policy changes, (9) social acceptance, and (10) assurance of choice (adaptability to future uncertainties).

Based on the assessment of these 10 viewpoints, the Atomic Energy Commission reached the conclusion that "our basic policy is, aiming at using nuclear fuel resources as effective as reasonably achievable, to reprocess spent fuel and to effectively use the recovered plutonium and uranium, while ensuring safety, nuclear non-proliferation and environmental protection, and paying due attention to economic viability."

Prior to this Framework for Nuclear Energy Policy, the "Basic Law on Energy Policy" was enacted in June 2002 in Japan. With a stable energy supply and environmental conservation as the premises, this law calls for drawing on market principles. Pursuant to this law, the "Basic Energy Plan" was set by the Cabinet in October 2003. Nuclear energy is positioned as a basic energy for the nation, and with 2006 being the year for a planned revision of the plan, there have been discussions within the government and political parties on promoting the use of nuclear energy, including the nuclear fuel cycle and fast reactors.

In the "Strategies for Promotion of Each of the Eight Areas", established together with "the 3rd Science and Technology Basic Plan" in March 2006 by the Council for Science and Technology

Policy which is chaired by the Prime Minister and responsible for deciding the overall research and development policies of Japan, “fast breeder reactor cycle technology” was selected as one of the five “key national technologies” considered to be the large-scale national programs in which concentrated investments should be made under national goals and long-term strategies, out of many strategic critical sciences and technologies.

I have just outlined Japan’s nuclear energy policy. Regarding fast reactors, however, my own views differ a little from the approach of this policy in terms of how those should be introduced. The basic line of thinking is without doubt that the eventual goal of fast reactors in making preparations for future conditions in which uranium resources will have become scarce is to breed more fuel than they consume as fast breeder reactors, but I would like to draw your attention to the role that fast reactors should play before that. Fast reactors are expected to complement light-water reactors by doing what the latter are incapable of. Breeding fuel is not the only role of fast reactors, but I also expect fast reactors play more important role for the time being.

What I consider to be very important at the moment is focusing on the concept of fast reactors burning plutonium and minor actinides which simply turn into waste at present, a concept that has also been proposed recently by the US in the form of GNEP.

With the slow neutrons of light-water reactors, nuclear fission rarely occurs for such elements as neptunium, americium and curium, collectively known as minor actinides, and they thus become waste. Because the radioactive decay of such waste takes a very long time, ensuring management for hundreds of thousands of years is required. It is this enormous timescale greatly exceeding common social perception that makes it difficult for the public to readily accept the disposal of high-level radioactive waste. However, because fission of even these long-lived minor actinides is possible with the fast neutrons in fast reactors, they are able to be used as energy rather than being turned into waste, and it is possible to render waste relatively short lived.

More specifically, in comparison with the time it takes until the radioactive toxicity of high-level radioactive waste decays to a level equivalent to natural uranium (please refer to the figure), about 100,000 years are necessary in the case of direct disposal of spent fuels without reprocessing.

Applying state-of-the-art reprocessing technology will reduce this time period to about 10,000 years. Recovering and burning minor actinides in fast reactors reduces this time to about 200 to 300 years.

In order to establish waste disposal measures for the current light-water reactors system as soon as possible, it is important to make it more acceptable to the public by reducing the harmful period of high-level radioactive waste. For this purpose, it should be accelerated to establish the technologies to burn long-lived nuclides such as minor actinides in fast reactors in order to reduce the environmental burden.

According to the Framework for Nuclear Energy Policy, the plan is to start commercial operations of fast reactors around the year 2050, but in my own view, it is necessary to build and operate a demonstration reactor by around 2030, in order to have a clear grasp of the results of burning minor actinides and to incorporate what is learned into the design of the next-stage commercial reprocessing plant.

Along these lines, a more realistic approach is to start accumulating the knowledge for technologies necessary for fast burner reactors early, in preparation for future operation, from the viewpoint of focusing on and addressing the environment and waste issues. Furthermore, in light of Japan’s principle of not possessing plutonium without a specific purpose for use, I believe it important to first promote the overall development process in the form of a plutonium burner reactor, and to take measures to enhance the proliferation resistance of the fast breeder reactor system. To this end, advanced reprocessing technologies and facilities would also be necessary early. There are

many challenges to address from now toward the commercialization of fast breeder reactors up to 2050. It is important to conduct a comprehensive study at an early stage regarding what kind of technological developments should be promoted for the entire fast breeder reactor cycle system, and to efficiently promote the established plans through international cooperation and other means.

Current examples of international collaborations with regard to advanced recycling systems include the Generation IV International Forum (GIF) and the GNEP recently proposed by the US, but it is not necessarily efficient to pursue parallel research and development activities focusing on various wide range of options.

I believe it important to narrow the focus as early as possible on a few highly promising technologies, such as the sodium-cooled fast reactors and advanced aqueous-reprocessing, based on matters such as the technical know-how and results achieved and accumulated in the US, France, Japan and other countries, and the future potential of these technologies. I also believe that it is important to efficiently and effectively promote research and development activities including the standardization process, by concentrating international development resources including financial and human resources.

(2) Japan's efforts toward ensuring transparency and confidence in promoting the peaceful use of nuclear energy

We have seen how essential the nuclear fuel cycle policy has been for Japan, but in the efforts to promote this policy, as a non-nuclear-weapon state, it was not at all easy to gain the understanding and trust of the international community early on. I would now like to describe Japan's efforts up to now in this area.

As you well know, nuclear energy is used not only for peaceful purposes such as power generation, but also possibly for military purposes including nuclear weapons. As Japan is the only country in the world ever to have atomic bombs dropped on it, we here actually experienced the horrors of nuclear weapons. Accordingly, it was stipulated in the Atomic Energy Basic Law of Japan that the research, development and use of nuclear energy should be limited only to peaceful purposes and should be conducted in fully democratic operations. Furthermore, the Three Non-nuclear Principles were established as Japan's basic national policy of "not possessing, not producing and not permitting the introduction of nuclear weapons into Japan." Japan has resolutely observed these laws and regulations, focusing on only the peaceful use of nuclear energy.

Japan also proactively contributed to the establishment of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the most fundamental and universal framework for achieving both the peaceful use of nuclear energy and the prevention of the proliferation of nuclear weapons, and has joined the Treaty as a signatory. Under this treaty, Japan concluded the Comprehensive Safeguards Agreement with the International Atomic Energy Agency (IAEA), and has made proactive contributions to the discussions to strengthen the safeguards system, triggered by the suspicion of nuclear weapon development in North Korea and Iraq. Regarding the Additional Protocol established as a result of this process, Japan became a role model for other countries in the world by becoming the first country possessing large-scale nuclear energy programs to ratify the Protocol. Japan has also dutifully maintained its state system of accounting for and control of nuclear material, has fully accepted inspections by the IAEA at all of its nuclear installations, and has observed in good faith the non-proliferation norms shared by the global community. Japan has argued that the safeguards agreement including the Additional Protocol should be considered the standard for the international community, appealing to the world for its universalization.

At the time of building the reprocessing plant in Tokai-mura and starting its operations, Japan had not ratified NPT and had not concluded the safeguards agreement with the IAEA, meaning that Japan was not obliged to make any disclosure to the IAEA. In spite of this, Japan gave explanations to the IAEA on the facility design as necessary and welcomed IAEA inspections, actively

cooperating with the IAEA on this matter. However, immediately prior to the planned start of plant operations in 1977, there was a review of the non-proliferation policy by the US government, and the US requested Japan change the initial design, in which only plutonium could be extracted. In response, Japan cooperated with the International Nuclear Fuel Cycle Evaluation (INFCE) and took part in good faith in the discussions with the US. As a result, Japan decided to revise a part of its original design, modifying it with considerable effort to adopt the co-conversion method, in which plutonium solution is first mixed with uranium solution before conversion, and starting operations only after this modification.

Furthermore, regarding the Rokkasho reprocessing plant, which is the first commercial scale plant in a non-nuclear-weapon state and currently undergoing active tests using real spent fuel, Japan has carried out various activities relevant to safeguards implementation. Voluntary contribution in support of extrabudgetary activities by Japan to the IAEA resulted in the establishment of the Large Scale Reprocessing Plant Safeguards (LASCAR) project, and Japan was active in contributing to the examination of the safeguards methods and procedures as applied to industrial reprocessing plants. Japan closely collaborated with the IAEA and the US from the design stage of the Rokkasho reprocessing plant, providing design information and examining specific safeguards methods, based on which Japan developed a variety of safeguards technologies. For example, Japan introduced the Near Real-time Accountancy System (NRTA), which, in addition to the periodic verification conducted by the IAEA of the inventory of nuclear materials, makes it possible to grasp the nuclear materials inventory in shorter intervals. Another efficient safeguards technology developed and introduced by Japan is an inspection system enabling remote monitoring, without the need for an inspector to actually visit the site, leading to the creation of a very sophisticated overall inspection system. In addition, whereas samples taken in inspections by the IAEA were formerly sent to a safeguards analytical laboratory in Austria for analysis, a laboratory dedicated to safeguards analysis (on-site laboratory) was set up on the premises of the Rokkasho reprocessing plant, which the IAEA can also use and which enables quicker and more precise analysis work.

These reprocessing plants are to be constantly monitored by cameras, various detection devices and the IAEA inspectors stationed at each site 24 hours a day. Other nuclear fuel cycle facilities in Japan are also under the rigorous monitoring of the IAEA. Japan actively cooperates with IAEA unannounced access and with complementary access, which substantially raise the level of effectiveness of the safeguards and which include such activities as inspections without prior notice at uranium enrichment plants and Short Notice Random Inspections (SNRI) at uranium fuel fabrication plants, even though these measures translate into a considerable burden on the part of the operators. In this way, through an accurate grasp of the inventory and the transferred amount of nuclear materials under the state system of accounting for and control of nuclear material, and through declarations to the IAEA regarding such information under the safeguards agreement, as well as through appropriate acceptance of IAEA inspections, Japan has ensured transparency regarding control of nuclear materials and the peaceful use of nuclear energy.

Furthermore, with regard to the environmental sample analysis, an important means for reinforcing IAEA safeguards under the Additional Protocol, Japan Atomic Energy Agency (JAEA) has established the Clean Laboratory for Environmental Analysis and Research (CLEAR). CLEAR is capable of conducting highly precise analyses of minute amounts of ultra-trace nuclear materials, by measuring the isotopic ratio of each particle of the nuclear material contained in dust on swipe samples and through other means. With CLEAR accepted into the IAEA network analytical laboratories and through analyses of the safeguards samples from other countries, Japan has actively supported the analysis activities of the IAEA.

In June 2004, Japan became the first country with large-scale nuclear energy programs developed to be provided by the IAEA with the broad conclusion not only of non-diversion of nuclear material placed under safeguards but also of “the absence of undeclared nuclear material and activities” existing in Japan, recognizing Japan’s transition to integrated safeguards status. This effectively means that the cooperative activities and efforts by Japan up to now concerning the

safeguards have born fruit and have been highly rated on an international level. This recognition is equivalent to a milestone encouraging Japan to continue working even harder, in light of the start of full-scale operations of the large-scale reprocessing plant and the restart of the operations of the fast breeder reactor not far behind.

Japan has not only observed its own international obligations but has also proactively cooperated with activities promoting the universalization of the Additional Protocol and reinforcing export control measures. Additionally, Japan has been active in international activities in the area of denuclearization and nuclear disarmament, including the establishment of the International Monitoring System under the Comprehensive Test Ban Treaty (CTBT), the disposition of Russian surplus weapons plutonium, and the dismantlement of decommissioned Russian nuclear submarines in the Star of Hope project.

Under the principle of not possessing plutonium without a specific purpose for its use, Japan's efforts have included public announcements, prior to any reprocessing, of plans regarding the use of plutonium recovered through the reprocessing of spent fuel, in order to further raise the level of transparency for the nuclear cycle.

In this way, Japan has shown "how a non-nuclear-weapon state should and could conduct nuclear cycle activities," demonstrating to the world a model example, as it were. At present, Japan is the only non-nuclear-weapon state that is internationally accepted to implement full set of nuclear fuel cycle activities. However, this means that, far from Japan being the exception, the door is open for other countries to also engage in activities related to the nuclear fuel cycle, if they are able to gain the understanding and trust of the global community by raising the level of transparency regarding nuclear energy development programs and promoting non-proliferation, just as Japan has done. However, it should be noted that, as described here today, Japan has steadily made quite extraordinary efforts to gradually achieve specific results over decades, and this may not be easy to emulate.

(3) Expectations toward, and challenges faced by, nuclear fuels supply assurance and GNEP

Some proposals have recently been presented for strengthening the nuclear non-proliferation regime. These are based on a notion that nuclear weapons may spread even under the current regime, which mainly consists of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the safeguards of the International Atomic Energy Agency (IAEA), when more non-nuclear-weapon states possess sensitive technologies, such as uranium enrichment, that can also be used in manufacturing nuclear weapons.

Typical proposals are the Multilateral Approaches to the nuclear fuel cycle put forward by Dr. Mohamed ElBaradei, the Director General of IAEA, and the suggestion for limitations on enrichment and reprocessing plants as presented by US President George W. Bush. It seems recently that these proposals move forward a common, near-term goal of establishing an international nuclear fuel supply assurance system. In addition, a more expanded plan, the GNEP, was announced by the US in February 2006, incorporating more long-term activities.

I would now like to state my views concerning the expectations toward, as well as the perceived challenges to address, for these proposals and plans.

Japanese government policy on these proposals is shown in the Framework for Nuclear Energy Policy, drawn up by the Atomic Energy Commission and set by the Cabinet in October 2005, that states "Japan will actively participate in discussions on new proposals for the maintenance and strengthening of the nuclear non-proliferation regime, including Multilateral Nuclear Approaches (MNA), while assessing whether to contribute to the enhancement of the international nuclear non-proliferation regime and promotion of peaceful use of nuclear energy." Based on this policy, the Nuclear Energy Subcommittee of the Advisory Committee for Natural Resources and Energy under

the Ministry of Economy, Trade and Industry is studying measures for contributing to the international nuclear fuel supply assurance system, one of which would likely involve enhancing the capacity of the Rokkasho uranium enrichment plant with the advanced centrifuges currently under development.

Although the details of current studies among related countries regarding such an assurance system are not necessarily clear, my understanding is that these studies aim to establish a mechanism in which supplier countries and the IAEA will assure the supply of enriched uranium for any country which forgoes its own uranium enrichment plant, even if conditions become unstable in the global enriched uranium market.

Such efforts are very important in the sense that, as Dr. ElBaradei has pointed out, for any developing country planning the introduction or expansion of nuclear power generation or any country with small-scale nuclear energy programs, it would no longer be necessary to build its own new uranium enrichment plants, with the result that the proliferation of these sensitive technologies would be prevented, while the peaceful use of nuclear energy is promoted in the world.

However, when considering the suspicion of nuclear weapon development in such countries as Iran and North Korea, which these proposals originally aimed to address, it seems that these countries do not necessarily want a stable supply of nuclear fuels, but focus more on the acquisition of the nuclear fuel cycle technology itself. Therefore, although establishing an international nuclear fuel supply assurance system would certainly exert some pressure on such countries, this would not be enough to drive them to give up their own uranium enrichment plants, and the original problems would unfortunately remain unsolved through such means alone.

There is also concern that, in spite of their insufficiencies as countermeasures to deal with the countries of concern I have just mentioned, assuring the nuclear fuel supply or placing a moratorium on the construction of new uranium enrichment and reprocessing plants, as informally proposed by Dr. ElBaradei, may impose unnecessary restrictions on the rights of peaceful use of nuclear energy for countries complying in good faith with the international nuclear non-proliferation norms.

Furthermore, in the statute of the IAEA established about 50 years ago, there are actually already provisions for similar roles to be fulfilled by the IAEA regarding fuel supply. Regarding methods of assuring the supply of nuclear fuel services while ensuring nuclear non-proliferation, some studies were also conducted about 30 years ago under the International Nuclear Fuel Cycle Evaluation (INFCE) project and by the following Committee on Assurances of Supply (CAS). But with no agreement reached, the discussions were discontinued at that time. Thus, the fact that, although the issue of fuel supply assurance was examined at times in the past, no concrete plan ever materialized clearly shows that this is not an easy issue to address.

I would now like to take a look at GNEP, which I have already mentioned.

First of all, this is very welcome in the sense that the US government has now returned to a nuclear fuel cycle policy including reprocessing and fast reactors, after having a negative policy for almost 30 years since the establishment of the non-proliferation policy in 1977 under President Carter.

As I mentioned earlier, GNEP has the potential to substantially reduce at an early stage the amount and toxicity of high-level radioactive waste, through reprocessing of spent fuel and fast reactor operations. The plan thus has a very significant meaning in terms of establishing effective waste disposal measures as early as possible. Furthermore, developing advanced recycling systems and small reactors with more proliferation resistance would help satisfy global energy demand, not only in advanced countries but also in developing countries, with clean and environment-friendly nuclear energy, while maintaining and strengthening nuclear non-proliferation .

This plan is quite a long-term project covering more than the next few decades. As the plan

should be promoted with international cooperation aiming at the goal of further growth of the peaceful use of nuclear energy in the world and further reducing the environmental burden, it is hoped that this policy is maintained on a long-term basis in the US itself as well.

The present approach toward fast reactors in GNEP is a little different from that in the Japanese Atomic Energy Commission's policy, with the main difference lying in whether to aim at only the burning of plutonium and minor actinides, or to also consider the breeding of plutonium as the eventual goal. Regardless, it is believed that, at least on the point of burning plutonium and long-lived nuclides such as minor actinides to further reduce the environmental burden caused by high-level radioactive waste, there are many common aspects in technological development. For this reason, there are expectations that Japan can extensively cooperate with and contribute to the plan in the areas of nuclear fuel cycle technologies and safeguards measures, which Japan has developed and cultivated over time.

On the other hand, there are also a number of questions to pay attention to regarding GNEP.

The first question concerns how to ensure equality. As you well know, due to the indefinite extension of NPT in 1995, the countries of the world are currently permanently classified into the fixed categories of "nuclear-weapon state" and "non-nuclear-weapon state," which makes NPT an unequal treaty. It has been understood, however, that the provisions of the treaty should not be interpreted in a way that affects the inalienable rights of all signatories regarding peaceful use of nuclear energy, regardless of whether the country is a nuclear-weapon state or non-nuclear-weapon state, as long as the non-proliferation obligations are observed as stipulated in the treaty.

In contrast, the thinking of GNEP is one which divides countries into the two categories of "nuclear fuel cycle country" and "nuclear power generation country" in terms of the peaceful use of nuclear energy. There is concern as to whether this new classification will be accepted or not by the global community, in relation to the equality of countries' rights to the peaceful use of nuclear energy, as provided for in NPT.

In the case of NPT itself, no further increase in the number of nuclear-weapon states was considered the topmost priority in light of the international political situation at that time, and a cutoff date of January 1, 1967, was established as a result, with the five countries that had manufactured and set off nuclear explosive devices prior to this date designated as the nuclear-weapon states, in an effort to prevent the future possession of nuclear weapons by any other country. Although there have been numerous discussions over the years regarding the legitimacy of this classification, the number of NPT signatories has now reached 189 countries and NPT is currently accepted by the global community as the universal non-proliferation treaty.

Therefore, rather than attempting to establish a new framework different from that of NPT in order to strengthen the nuclear non-proliferation structure, the results achieved up to now through NPT should be praised, given that there has been no actual use of nuclear weapons during the past 30 years. Although efforts should be made to reduce the discrimination between nuclear-weapon and non-nuclear-weapon states, I believe that the basic spirit of NPT should be firmly maintained.

It may be a quite different story, however, for the classification into "nuclear fuel cycle countries" and "nuclear power generation countries." The intention of permanently fixing these conditions, by paying attention only to the fact of whether or not a country possesses nuclear fuel cycle technologies at this point in time, may not necessarily be the best option for the purpose of promoting both the global evolution of the peaceful use of nuclear energy and nuclear non-proliferation.

It is indeed necessary to strengthen the overall system for preventing proliferation of nuclear weapons, and introducing a certain classification may be necessary. However, the aim should not be to permanently fix these conditions. It is important to establish a flexible system that, with NPT as the basis, is capable of evolving over time in response to changes in the situation. I believe it more

desirable in a mid- or long-term timeframe to establish a system, which, for example, allows that a non-nuclear-weapon state would be eligible for the transition from a nuclear power generation country to a nuclear fuel cycle country, in accordance with certain objective and fair criteria. These criteria may include its meaningful results achieved through its active efforts to fulfill international nuclear non-proliferation responsibilities, its recognition as having reached the stage of legitimately possessing nuclear fuel cycle technologies based on the scale of nuclear power generations in the country and other factors. It should be noted here that the concept of such institutional measures capable of flexible evolutionary progress was already incorporated into the International Nuclear Fuel Cycle Evaluation conducted in the late 1970s.

A possible concrete idea may be to offer any country receiving nuclear fuel cycle services the opportunity to move on to a collaborative relationship in phases with a nuclear fuel cycle country or countries in the future, in accordance with the level of trust the global community places in this country. In such collaborative relationships, it may be possible for the receiving country to send trainees to the nuclear fuel cycle country, or for both of these countries to engage in joint activities.

Such a phased approach is believed to help not only just in eliminating merely formal differentiations and discrimination but also in raising the incentive of any non-nuclear-weapon state willing to promote the peaceful use of nuclear energy while observing in good faith the nuclear non-proliferation norms. That is to say, this approach would in effect be useful for promoting both the peaceful use of nuclear energy and nuclear non-proliferation simultaneously.

It is possible to describe Japan as a model non-nuclear-weapon state that has carried out nuclear fuel cycle activities, demonstrating to the world what can actually be achieved. The example of Japan should be made the best use of as a “best practice” model for other non-nuclear-weapon states.

Still, although applying the IAEA safeguards is not required for any civil installations in nuclear-weapon states under NPT at present, it is hoped that a study will be conducted in the near future to ensure equality in the application of IAEA safeguards as well, when nuclear-weapon states are engaged in the peaceful use of nuclear energy as nuclear fuel cycle countries.

In any case, I believe that it is necessary to conduct more in-depth discussions on an international level regarding recent proposals such as those on fuel supply assurance and GNEP, from the viewpoints of strengthening the nuclear non-proliferation structure and of promoting the development of the peaceful use of nuclear energy, so that the effectiveness of these proposals may be further enhanced.

The second question I would like to point out is regarding the introduction of an isotopic classification for plutonium. From the viewpoint of ensuring non-proliferation, it is necessary to take appropriate measures so that nuclear material used for peaceful purposes is not diverted to military use.

For this reason, the risk of proliferation of uranium is currently assessed according to its enrichment level, which is classified into high-enriched uranium, low-enriched uranium, natural uranium and depleted uranium, with the safeguards applied in line with each category. To reduce the risk of proliferation, technical measures such as switching from high-enriched to low-enriched uranium in research reactors are also being implemented.

However, at present there is no corresponding plutonium isotopic classification, meaning that the same safeguards procedures are applied to all plutonium regardless of the isotopic ratio of plutonium-239. However, there is considerable difference in the proliferation risk of weapons-grade plutonium (isotopic composition of approximately 93% plutonium-239) and reactor-grade plutonium (isotopic composition of approximately 58% plutonium-239). It should also be noted, in particular, that there has never been any case of nuclear weapons being manufactured from the plutonium derived from light-water reactors.

From this standpoint, to promote the effective utilization of plutonium as an energy source for peaceful purposes, it is important to introduce appropriate isotopic classification for plutonium as well, and to take optimum measures based on such a classification.

There should also be an appropriate assessment of the fact that resistance to plutonium proliferation is increased when, rather than existing as a separated element, plutonium exists in the form of uranium-plutonium mixed oxide fuel (MOX) or when it is mixed with transuranic elements, as noted in the GNEP proposal.

The third question I would like to focus on in relation to GNEP concerns the final disposal of waste, which is naturally an important matter to address in each and every country. GNEP proposes the recovery and the effective utilization of uranium, plutonium and minor actinides as energy by applying advanced recycling technologies, which would considerably reduce the amount of high-level radioactive waste as well as the radioactivity over a shorter time period, thus lessening the overall environmental burden.

Because highly sophisticated technology would be required for the development of such waste-reduction technologies, it is important for the nuclear fuel cycle countries to put forth their best efforts by cooperating with each other, and the fruits of this labor should be equally shared for use by the global community.

However, there should be a clear distinction between responsibility for technological developments and responsibility for the final disposal of the waste generated. Considering that any export of waste is prohibited according to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, I believe that the country benefiting from the use of nuclear energy should itself assume responsibility for final waste disposal. However, it is hoped that the final disposal activities in the source countries will become easier to undertake with the establishment of advanced recycling technologies through the mutual cooperation of nuclear fuel cycle countries and with the resulting reduction to the extent possible in the environmental burden caused by high-level radioactive waste.

(4) Expectations toward the US-India Civil Nuclear cooperation, and challenges to address in relation to non-proliferation

Against the backdrop of the recent rapid rise in the price of fossil fuels and the heightened focus on environmental issues, lately there has been a spate of moves toward the construction of nuclear power plants, not only in more advanced countries but in developing countries. Establishing and maintaining a more effective nuclear non-proliferation structure is now considered necessary in line with these current conditions.

India has a population of more than one billion, second only to China. In recent years, oil consumption and imports have rapidly increased in India, and with a continuing rise in energy demand projected for the near future as the population increases, the economy grows and living standards improve, securing its energy has been a major question to address. In fact, India has been actively engaged in oil field development projects overseas in recent years, and there is some concern that India's activities may seriously impact the worldwide supply and demand of fossil fuels including oil, if the current trend continues unabated. At the same time, because India has carried out nuclear tests in the past, imports of uranium and nuclear technologies from other countries were suspended, leading to the current conditions where India is unable to promote nuclear power generation as much as it would like. In these circumstances, cooperating with India on nuclear energy is believed very important, in the sense that satisfying its increasing energy demand with nuclear power will contribute toward easing the global supply and demand of fossil fuels and also toward dealing with the problem of global warming.

It was against this backdrop that the US reached a basic agreement with India in July 2005 on

civil nuclear cooperation, and on March 2, 2006, the two countries reached an agreement on the categorization of India's nuclear facilities into those for military and civil purposes.

From the viewpoint of promoting nuclear non-proliferation, NPT has been the treaty forming the pillar of the international nuclear non-proliferation regime, with a large number of member states at present. Since coming into effect in 1970, NPT has helped establish and improve nuclear non-proliferation norms. However, India has been opposed to NPT for over 30 years, and has, as a nonmember state, manufactured and possessed nuclear weapons outside the NPT regime. It is an undeniable fact that attempting to persuade India to join NPT as a non-nuclear-weapon state would be an unrealistic undertaking at this point in time. However, this does not mean that leaving the current conditions as they are is the desirable option. As the only country that has suffered atomic bombing, there is no change in Japan's basic stance of requesting that each and every country move toward the ultimate elimination of nuclear weapons, but in light of the current situation, the US-India civil nuclear cooperation is believed to be quite significant since such cooperation can in essence engage India in the nuclear non-proliferation regime. I have heard that the IAEA has also rated this bilateral cooperation highly from this perspective. It is hoped that the prospect of India being effectively incorporated into the nuclear non-proliferation regime would further strengthen the non-proliferation norms.

In fact, in the US-India Joint Statement in July 2005, India promised to separate civilian and military nuclear facilities, place its civil nuclear facilities under the IAEA safeguards, sign the Additional Protocol, continue its moratorium on the testing of nuclear weapons, work with the US for the conclusion of Fissile Material Cut-off Treaty (FMCT), reinforce export control measures within the country, and so on.

However, it is a fact that there are a number of concerns surrounding the US-India civil nuclear cooperation.

Given that India possesses nuclear weapons outside the NPT regime, cooperating with such a country actually goes against the fundamental principle of NPT, where a country can enjoy the benefits of the peaceful use of nuclear energy only by abandoning nuclear weapons in its possession; and one of concerns is how the NPT regime will be affected by such a cooperation. A misleading message may be sent to the global community, a message causing the misunderstanding that it is possible to cooperate with other countries on nuclear energy even if in possession of nuclear weapons. For example, it is conceivable that the US-India cooperation may have a substantial effect on the still unresolved issues regarding nuclear weapon development in Iran and North Korea. To say that the cooperation on nuclear energy and nuclear fuel cycle technologies will be allowed for India even though it possesses nuclear weapons, while they are denied to Iran and North Korea will not be very convincing to the global community. Such a move may be criticized as the application of a double standard. More than anything else, such a move could very well give Iran and North Korea an excuse for nuclear weapon development. I believe it necessary to establish objective standards and reasoning in order to preempt and counter any argument claiming a double standard with regard to the ongoing US-India civil nuclear cooperation.

In addition, Japan aims for the ultimate elimination of nuclear weapons, and my understanding is that this same spirit is incorporated into the preamble of NPT. It is believed that the global community will not be convinced unless the cooperation with India is accompanied by the message or principle that effectively engaging India in the nuclear non-proliferation regime through cooperation on nuclear energy is, in the long run, a move not for increasing the number of nuclear-weapon states but decreasing them. Regarding the bilateral cooperation between the US and India, I think it necessary to incorporate in some form activities that aim for future nuclear disarmament and elimination.

Furthermore, although it is appreciated that India has never transferred any of its nuclear weapon manufacturing technologies to other countries, we need to remind ourselves of the fact that

in spite of the promise of use for peaceful purposes, India actually used heavy water supplied by the US and a nuclear reactor manufactured by Canada for its detonation of a nuclear explosive device in 1974. To what extent it is possible to trust such a country may be a question that must be addressed.

Even supposing that one succeeds in persuading the countries of the world regarding these basic concerns in relation to NPT, I think some other concerns remain unanswered.

According to the agreement reached in March 2006, of the 22 nuclear reactors India is currently operating or building, 14 will be separated as civil facilities, to which the IAEA safeguards will be applied by 2014, and all the civil nuclear reactors will be placed under the safeguards in the future.

However, it cannot be denied that there still remains some lack of transparency as to whether a complete separation of the military and civil facilities is really possible. Even if a separation of the military and civil facilities is achieved, it will be important to guarantee that the nuclear fuels and technologies supplied for civil purposes will not be diverted to military use. Whether appropriate safeguards will really be carried out to this end remains unassured. It seems that India hopes for the application of voluntary safeguards just as for other nuclear-weapon states, but the question is, will sufficient transparency be ensured with such limited safeguards measures? I believe it necessary to apply to India safeguards similar to those currently applied to non-nuclear-weapon states, which would be convincing to the global community and which would absolutely ensure that technologies are not diverted to military use.

In fact, I think that in this regard, the same principle should apply not only to India but to other nuclear-weapon states as well. If other nuclear-weapon states take the initiative in accepting such safeguards, it will then become impossible to make India an exception. In order to convince India to accept safeguards similar to those currently applied to non-nuclear-weapon states, the nuclear-weapon states need to display leadership and set an example themselves. As I mentioned earlier, in order to lessen the degree of inequality and discrimination in the NPT regime, it is important to minimize the current gap in the safeguards as much as possible and to apply uniform safeguards to as many countries as possible. Given that there is a sense of dissatisfaction among many non-nuclear-weapon states at the current nuclear disarmament efforts of nuclear-weapon states and at the recent strengthening of the restrictions only on non-nuclear-weapon states, I think that this is one good opportunity for the nuclear-weapon states to show their efforts.

Another concern that needs to be addressed is the fact that in the agreement reached in March 2006, the fuel cycle facilities related to strategic programs, such as fast reactors, as well as reprocessing and enrichment plants, will not be covered by the safeguards. There is a concern that with this agreement, using fuel supplied from other countries for civil purposes, India may be able to use its own resources, previously used for civil facilities, for the manufacture of nuclear weapons, with the result that India's nuclear weapons manufacturing may actually be aided by the international cooperation. In order to dispel such concern, it will be necessary to apply safeguards to all the nuclear fuel cycle facilities including those under development and to ban the production of any fissile material for nuclear weapons. It is in effect important not only to engage India in negotiations for the treaty (FMCT) but also to firmly establish a framework to stop the production of fissile material.

In any case, with the variety of discussion and debate apparently occurring within the US, we will need to carefully watch the overall situation. On a global level, how best to deal with India is currently being discussed by the Nuclear Suppliers Group, and I believe it is also very important to pay attention to the moves of other countries.

(5) Summary

I have touched on many subjects today, and I would now like to look back on these topics for

a brief summary of today's talk.

First, regarding Japan's nuclear energy policy, the government has conducted an assessment from a variety of angles for Japan as a country with scarce natural resources. As the result, a nuclear fuel cycle policy of reprocessing spent fuel and effectively utilizing uranium and plutonium has been established as the basic Japanese policy, with the goal of achieving the fast breeder reactor cycle in the future. However, according to my own view, in order to reduce the long-lived nuclides contained in waste for the purpose of raising the level of social acceptance towards the disposal of high-level radioactive waste, an important challenge to first address is burning long-lived nuclides in fast reactors, which is impossible to do in light-water reactors. It is also important to accumulate technical know-how to prepare for future fast breeder reactors with the aim of breeding fuel. Additionally, regarding the research and development of advanced recycling technologies, it is important to focus on a few promising technologies, such as sodium-cooled fast reactors, at an early stage, based on the technical know-how and experiences accumulated in the US, France, Japan and other countries, and to efficiently and effectively promote research and development activities including the standardization process through active international collaborations.

Secondly, in order to ensure transparency and gain the trust of the international community, toward the smooth promotion of the aforementioned Japanese nuclear fuel cycle policy, Japan has been making extraordinary efforts, fully complying with international non-proliferation norms, developing and introducing a rigorous safeguards systems for its nuclear fuel cycle facilities and proactively cooperating with IAEA in its safeguards. We are confident that these efforts have led to Japan being highly rated and gaining the trust of the international community. It is our hope that by promoting the spread of such safeguards technologies and activities around the world, Japan can assume the role of a model for nuclear fuel cycle activities in non-nuclear-weapon states.

Thirdly, with the aim of strengthening the current nuclear non-proliferation regime based on NPT, an assurance of the nuclear fuel supply and the US's GNEP were recently put forth. In addition, the cooperation between the US and India on nuclear energy has drawn the attention of the international community. I have voiced my expectations for such moves and also a number of questions to address. Each of these proposals and plans has their strengths and weaknesses and it is important to improve these proposals, so that they will further strengthen non-proliferation. Rather than introducing new distinctions and categories among different countries and permanently fixing them, I believe it more important to introduce a system capable of flexibly evolving over time in accordance with contemporary conditions, while firmly maintaining the basic spirit of NPT. It is desirable to establish a structure under which the peaceful use of and international cooperation on nuclear energy will be gradually promoted, according to some objective and fair criteria, such as the level of trust placed by the international community in each country, based on the results achieved by the country in its nuclear non-proliferation activities.

For Japan, based on its unique position as the only country ever to suffer atomic bomb attacks as well as its position as a non-nuclear-weapon state promoting nuclear fuel cycle activities, it is important to continue to make proactive contributions toward the peaceful use of nuclear energy in the world and maintain and strengthen the international nuclear non-proliferation regime.

Particularly regarding GNEP and other relevant projects, there will be many areas to which Japan will be able to extensively apply its nuclear fuel cycle technologies, its safeguards technologies for various types of nuclear facilities and the wealth of its experience cultivated and accumulated over time. Therefore, it is hoped that we will study ways to actively cooperate with such projects and make meaningful contributions toward the peaceful use of nuclear energy and the strengthening of the non-proliferation regime around the world. In this context, Japanese Minister for Education, Culture, Sports, Science and Technology, Kosaka's proposal early in this month is a well-time quick response to the GNEP, which was agreed by US Secretary of Energy, Bodman, related to cooperation on the US nuclear fuel cycle facilities, collaborative fuel development by using "Joyo" and "Monju", collaborative establishment of safeguards concept, and so on. It is also

expected to materialize them early. In this regard, Japan Atomic Energy Agency (JAEA), currently the only comprehensive organization in Japan for the research and development of nuclear energy technologies, is expected to play an important role, making extensive contributions and achieving meaningful results in cooperation with related countries such as the US and France in the areas of peaceful use of nuclear energy and the strengthening of the non-proliferation regime in the world.

In conclusion, now, more than 60 years after the end of World War II, there are fewer and fewer Japanese people who have personal memories of nuclear weapons, those terrible weapons of mass murder. For me personally, the memory of seeing the flash of the atomic bomb in Hiroshima when I was 16 years old is still vividly etched in my mind. As one of the now few members of the human race personally possessing such memories, I pray and hope that a peaceful world with no nuclear weapons and with no need to rely on nuclear weapons will become a reality as soon as possible and that the international community will cooperate in using nuclear energy, which is a wonderful source of energy for our future, for peaceful purposes only, so that the entire human race will be able to build a community able to sustainably grow and prosper together.

Thank you very much for your attention.