

**Appropriateness of the Uses of Plutonium  
in “Plutonium Utilization Plans” Announced by Electric Utilities and the JAEA**

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Atomic Energy Commission

Each of ten electric utilities recently made public their “Plutonium Utilization Plan”, in which they announced that the plutonium recovered at the Rokkasho Reprocessing Plant in fiscal 2009 would be manufactured into uranium-plutonium mixed oxide (MOX) fuel to be used at their nuclear power plants from fiscal 2012. The amount of plutonium estimated for each utility to possess at the end of fiscal 2009 was equivalent to the MOX fuel necessary for executing their plan for 0.1 to 1.2 years.

Each utility explained that they were making a continuous and active effort to develop mutual understanding with local communities where nuclear power plants were located and gain the communities’ confidence in their ability to safely implement the plan to use plutonium recovered in the reprocessing of spent fuel from their nuclear power plants at overseas reprocessing plants. Some utility was in the process of gaining the local communities’ confidence in their measures to prevent the recurrence of improper acts in the plant operation, while others, by gaining the understanding of the local communities, have manufactured MOX fuel utilizing the plutonium stored at the overseas reprocessing plants and transported it.

The Japan Atomic Energy Agency (JAEA) also made public its “Plan to Use Plutonium for Research Purposes”, in which the JAEA announced that it had no plan to recover plutonium at the Tokai reprocessing plant in fiscal 2009 because it would continue the work of implementing measures to improve the seismic safety of the plant started in 2008. The JAEA also said that the plutonium recovered by the end of fiscal 2008 would be manufactured into MOX fuel, which would be used in its fast reactors “Monju” and “Joyo” from fiscal 2009. The amount of plutonium estimated for the IAEA to possess at the end of fiscal 2009 is equivalent to the amount of MOX fuel the JAEA is planning to use in its fast reactors for 6 years.

The JAEA explained that, as for “Joyo”, they were considering measures to repair the refueling facility partial damaged due to its interference with other equipment confirmed in November 2007, and that based on the results of the consideration, the JAEA would determine an operational plan and when to start the use of plutonium. As for “Monju”, they will continue preparatory works to resume its operation, such as the repair of the corrosion hole found in its outdoor ventilation duct discovered in September 2008 and the test of entire system functions.

Considering these explanations, the Commission judges that the objective of plutonium utilization given in the “Plan” recently announced by each electric utility and the JAEA is appropriate at this time from the viewpoint of assuring the transparency of plutonium utilization in Japan. The Commission expects that the utilities and the JAEA will explain the objective in more detail as they make progress in these efforts.

The utilities who handle the MOX fuel should understand the international community's strong concern about plutonium use in Japan, and with this in mind, they should make sure that safeguards activities to assure nuclear nonproliferation will be implemented without any trouble and they also should carry out necessary measures for assuring nuclear security. In this process, they must ensure that every member of their organizations will be aware of the necessity of the strict control of information on nuclear security. They must also keep striving to gain public understanding of the principle that the disclosure of information on nuclear security should be limited exceptionally, although nuclear activities should basically be open to the public.

[Background Information 1]

### **Ensuring the Peaceful Use of Plutonium**

Japan has limited the promotion of research, development and utilization of nuclear energy only to peaceful purposes by the Atomic Energy Basic Law and joined the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) as a non-nuclear-weapon State. Japan has accepted the International Atomic Energy Agency (IAEA) safeguards for all its nuclear-related activities, concluding the comprehensive safeguards agreement and the additional protocol with the IAEA. Simultaneously, the Government of Japan has established and implemented its own safeguards system to ensure that domestic nuclear activities are only for peaceful purposes.

In specific terms, licensees of nuclear facilities are asked to regularly submit to the Government an inventory change report and a material balance report on the nuclear fuel material in the facility based on the material accounting rules approved by the Government. In addition, strategic points of the facilities are sealed and put under camera surveillance, and inventory changes and the integrity of the seals are inspected by the government inspectors regularly as well as irregularly without prior notice. In the case of the Rokkasho reprocessing plant of the Japan Nuclear Fuel Limited (JNFL), government inspectors are permanently residing at the site and performing their duty. Moreover, the information about material accounting activities at the facilities, including the inspection result, is reported to the IAEA, which conducts independent inspections by themselves.

It is commonly recognized in the international community that establishment and strict operation of such systems will prevent plutonium, which is brought into the country or separated and recovered through domestic reprocessing, from being diverted to purposes other than peaceful ones. Needless to say, the system currently in place at the Rokkasho reprocessing plant is internationally accepted as appropriate from this viewpoint.

It is strongly required in the international community to enhance measures for nuclear security. Responding to this situation, Japan has partially revised the Act on Regulation of Nuclear Source Materials, Nuclear Fuel Materials and Reactors, and has taken various steps to appropriately enforce regulations for physical protection of nuclear materials, which include: physical protection measures corresponding to the design basis threat (DBT) standards set by the Government; the inspection conducted by the Government to assess compliance with the physical protection rules; and the security regulations of information on physical protection.

[Background Information 2:]

### **Improvement in the Transparency of Plutonium Use**

The peaceful use of plutonium in Japan has been strictly observed and secured under the aforementioned domestic and international safeguards regime. However, international shipments of plutonium occurred more frequently during the 1990s as civilian plutonium utilization activities, such as “plu-thermal operations” in various countries, became more active worldwide. In light of this, based on the recognition that it was desirable to increase the transparency of use of plutonium

internationally, nine nations (Belgium, China, France, Germany, Japan, Russia, Switzerland, the U.K. and the U.S.) started discussions on the way to improve the transparency of civilian use of plutonium. As a result, the “Guidelines for the Management of Plutonium” were adopted in December 1997 for the responsible management of plutonium in all peaceful nuclear activities. These included guidelines for the publication of information on the national holdings of civil plutonium and national strategies for the nuclear fuel cycle, and general plans for managing them. Each country has reported such information to the IAEA and the IAEA released them to public every year since then.

Japanese electric utilities have contracted to reprocess spent fuel with European reprocessing companies and in order to use plutonium in their light water reactors or promote “plu-thermal operations” plans, let European contractors start to fabricate MOX fuel since 1997, using the plutonium recovered and stored there. In addition, a considerable amount of plutonium will be recovered in Japan and used annually by these utilities after the completion of the construction of Rokkasho reprocessing plant, Japan’s first commercial reprocessing plant.

In light of the expectation that the time would soon come for these private companies to recover and use plutonium in Japan, the Atomic Energy Commission (AEC) decided to strengthen management and disclosure of information on plutonium inventory, in order to improve both national and international understanding of and credibility regarding the principle of not possessing plutonium reserves for which the purpose of utilization is unspecified as well as Japan’s strict adherence to the peaceful use of plutonium. The AEC thus announced a decision of position in a paper entitled “Concerning the Basic Position on Japan’s Use of Plutonium” (hereinafter referred to as “the Position”) in August 2003. The Position stipulates that a plutonium utilization plan, which specifies how to use the plutonium in addition to the owner and the holding of it, shall be announced, as Japan’s original measure, by private companies each year before the start of plutonium recovery operations at the Rokkasho reprocessing plant, in addition to the disclosure by the Government about the current state of plutonium management in the context of nuclear safeguards. The Position also specifies that private companies when using plutonium stored abroad for fabrication of fuel and national R&D institutes when using plutonium for R&D purposes shall observe the Position.

As seen in the past situation in Japan as well as in abroad, plutonium may have been stored for a considerable period when the place and time for the utilization of plutonium recovered in the reprocessing plant are determined in detail. Given the issues surrounding plutonium as a sensitive material, the AEC still considers it appropriate for private companies to clarify a plutonium utilization plan every year, including information on the plutonium to be recovered in the coming year, from the viewpoint of maintaining the transparency of the plutonium utilization, even if the details of such a plan have yet to be worked out, since the plans are always updated and the details are gradually made available by such activities.

Based on the Position, the utilities and the JAEA have made their “Plutonium utilization plans” public since fiscal 2005.

[Background information 3]

### **Plutonium Utilization Plans Announced by Electric Utilities**

The plutonium utilization plans, which 10 electric utilities announced on 6 March 2009, show that they will own plutonium to be separated at the Rokkasho Nuclear Fuel Reprocessing Plant in fiscal 2009 in order to process it into the MOX fuel at a MOX fuel plant to be completed at Rokkasho Village in fiscal 2012 and utilize the MOX fuel for “plu-thermal operations” of their nuclear power plants starting in or after fiscal 2012. Part of their plutonium holdings are planned to be transferred to the JAEA for FBR research and development activities and Electric Power Development Co. for the planned “plu-thermal operations” of its Ohma nuclear power station. These utilities say that specific transfer amounts will be announced after they are fixed. Each company’s plutonium holding estimated for the end of fiscal 2008 is different from that reported on March 7, 2008 due to a change in the amount of spent fuel to be processed at the Rokkasho reprocessing plant in fiscal 2008 announced at that time. Separated and recovered plutonium will be stored at the Rokkasho reprocessing plant before being processed into MOX fuel. Their respective plutonium holdings at the end of fiscal 2009 are estimated to be equivalent to the 0.1 to 1.2 years of MOX consumption as “plu-thermal operations” planned by them. The plutonium utilization plans announced by the electric utilities are consistent with a published plan of Japan Nuclear Fuel Ltd. to reprocess spent nuclear fuel at its Rokkasho reprocessing plant and to build a MOX fuel plant, and with a “plu-thermal operation” project announced by Electric Power Development Co. for its Oma nuclear power plant.

Each electric utility has disclosed amounts of plutonium that it owns abroad. Locations of utilization of such plutonium are planned to be announced when the plutonium is processed into MOX fuel overseas.

[Background Information 4]

### **Plutonium Utilization Plans Announced by the JAEA**

In the “Plan to Use Plutonium for Research Purposes”, released on March 6, 2009, the JAEA says that it has no plan to separate plutonium at the Tokai reprocessing plant in fiscal 2009 because it would continue the work to implement measures to improve the seismic safety of the plant started in 2008. They also say that the plutonium recovered by the end of fiscal 2008 is to be manufactured into MOX fuel and utilized for FBR R&D purposes at “Joyo” and “Monju” in or after fiscal 2009. The amount of plutonium the JAEA is to hold at the end of fiscal 2009 is estimated to be equivalent to about six years of MOX fuel consumption planned by the JAEA. The JAEA says that it plans to buy plutonium to be separated at the Rokkasho reprocessing plant from electric utilities in the future. This is consistent with the explanations by electric utilities.