

The Problems Facing Nuclear Power in Japan Emphasising Law and Regulations

by Yoshio Baba*

I. Introduction

Japan was the first country to experience a nuclear attack when atomic bombs were dropped during World War II. After the war, the use and development of nuclear energy in Japan were limited to peaceful purposes, such as electric power generation, medical treatment, industry and fundamental research. Certainly, the most indispensable of these uses is nuclear power. Nuclear power now plays a very important role in the lives of Japanese people.

Japan has few natural energy resources, so it has regarded nuclear power as a necessary energy source that can help to achieve a stable supply of energy. The first commercial nuclear power plant in Japan, Tokai Power Station of the Japan Atomic Power Company Ltd., commenced operations in July 1966. At the present time, 51 nuclear power plants with an installed capacity of 44 917 MW provide about 30% of Japan's electricity produced by the electric power companies. Japan ranks third worldwide in terms of installed nuclear capacity. Thus, nuclear power has made a big contribution to a stable supply of electric power in Japan.

Nevertheless, in Japan today, the general public has a negative view of nuclear power development. There is no doubt that three incidents: the December 1995 sodium leakage at the prototype "Monju" fastbreeder reactor (hereinafter, referred to as the "FBR"); the March 1997 fire at the bituminisation facility for low-level radioactive waste at the Japan Nuclear Cycle Development Institute (hereinafter referred to as the "JNC") Tokai Facility; and the September 1999 criticality accident at JCO, a nuclear fuel conversion company in Tokai-mura, Ibaraki Prefecture – contributed significantly to this view. These three accidents damaged the nation's confidence in nuclear development. The government conducted thorough investigations and compiled reports concerning the causes of these incidents, following which it acted upon the lessons learned and proposals put forward during these investigations and reports.

Thirty years have passed since Japan started to develop and utilise nuclear power. The circumstances underlying nuclear power policies have substantially changed. The various problems that must be addressed in order to further develop the nuclear power industry in Japan are increasing.

In this paper, I will introduce Japan's three major nuclear energy-related laws. I will also discuss the present situation surrounding nuclear power in Japan, including various problems that the government and electric power companies are facing, with the emphasis on law and regulations.

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II. Japan's primary nuclear energy-related laws

The starting point for discussion of Japan's nuclear legislation is the Basic Atomic Energy Law (hereinafter referred to as the "Basic Law"). Other laws and ordinances derive from the Basic Law which sets out the framework governing the regulation of nuclear power.

1. The Basic Atomic Energy Law (the Basic Law) of 19 December 1955

The Basic Law states that its objectives are to secure energy resources for the future and to promote the research, development and use of nuclear energy for peaceful purposes. It goes on to establish a framework for the regulation of nuclear activities, specific aspects of which are to be dealt with in subsequent, separate laws.

Article 2 of the Basic Law sets out the three basic principles of democracy, independence and public disclosure governing the peaceful use of nuclear energy. Article 4 provides for the establishment of the Atomic Energy Commission (hereinafter referred to as the "AEC") and the Nuclear Safety Commission (hereinafter referred to as the "NSC") in the Cabinet Office to ensure a democratic approach to nuclear energy administration.

2. The Law for the Regulation of Nuclear Source Material, Nuclear Fuel and Reactors of 10 June 1957 (hereinafter referred to as the "Regulation Law")

This Law governs the location, construction and operation of nuclear facilities in Japan. The purpose of the Regulation Law is to ensure the peaceful use of nuclear source material, fuel and reactors, and to ensure public safety by preventing the hazards that arise from these materials and reactors. Specifically, it establishes the licensing regime governing all stages of nuclear activities and sets out essential rules to observe in international conventions.

The Regulation Law also provides for control over nuclear material and equipment, and restricts the transfer, importation and exportation of nuclear fuel material to those who are engaged in refining, manufacturing or reprocessing such material and to operators of nuclear facilities. These restrictions do not apply where the government receives or transfers nuclear fuel material at the national level or in accordance with international arrangements. Concerning nuclear materials, as internationally controlled materials, this Act provides that premises where nuclear fuel is present may be subject to inspection by the safeguards division at any time. Japan applies International Atomic Energy Agency (hereinafter referred to as "IAEA") Safeguards to nuclear material in conformity with its obligations under the Nuclear Non-Proliferation Treaty.

The Regulation Law also provides that operators of nuclear facilities are responsible for establishing security rules and procedures at their installations and in relation to specified nuclear materials contained therein. The operators must report any loss or theft of nuclear materials.

3. The Law Concerning Prevention from Radiation Hazards due to Radioisotopes etc. of 10 June 1957 (hereinafter referred to as the "Prevention Law")

The aim of the Prevention Law is to regulate the use, sale, disposal or any other handling of radioisotopes and radiation-emitting equipment in order to prevent radiation hazards and to secure public safety.

III. The Tokai-mura criticality accident

1. Revision of the Regulation Law and establishment of the Special Law on Emergency Preparedness for Nuclear Disaster

The Tokai-mura criticality accident was the worst in Japan's history of nuclear development and utilisation. The direct cause of the accident is understood to be repeated use of working procedures that did not comply with those proscribed in the licence.

After the criticality accident in Tokai-mura, the revised Law for the Regulation of Nuclear Source Material, Nuclear Fuel and Reactors (hereinafter referred to as the "revised Regulation Law") was adopted on 13 December 1999, taking into account the need to drastically enhance nuclear safety regulations in the wake of the accident. In addition, a new Special Law on Emergency Preparedness for Nuclear Disaster was adopted on 17 December 1999 based on lessons learned from current nuclear disaster prevention measures.

The revised Regulation Law entered into force on 1 July 2000, and the Special Law on Emergency Preparedness for Nuclear Disaster took effect as a special law to modify and complement the Basic Law for Countermeasures against Disaster on 16 June 2000. Assurance of prompt initial response, systematic linkage of national government with local governments, a strengthened national system for emergencies, and specification of the responsibilities of nuclear operators are the main points of this Law.

a) Revision of the Regulation Law

i) Inspection of facilities

The amendment of the Regulation Law reinforces the safety regulations governing the management and operational procedures of nuclear processing plants and nuclear energy facilities. Up until now, nuclear fuel fabrication and conversion facilities, unlike other major nuclear facilities, were not subject to inspection by the government to check their performance even where the form of nuclear business had been changed.

ii) Introduction of inspection system on compliance with safety regulations applicable to nuclear installations

This system was established considering that the working procedures, which deviated from those proscribed for such a licensed facility, directly caused the JCO criticality accident. This inspection system is now applicable to all nuclear businesses including the fuel fabrication business.

iii) Assignment of nuclear safety inspectors to main facilities

This system is also intended to verify compliance with safety regulations.

iv) Employee education and proposals for safety improvements for workers

These systems are intended to deal with the factors which indirectly caused the accident, including lack of knowledge of and interest in the safety aspects and ignorance in relation to breach of the laws and ordinances.

b) *Adoption of the Special Law on Emergency Preparedness for Nuclear Disaster*

This Special Law establishes the following principles:

i) Ensuring prompt initial actions

- The Nuclear Disaster Prevention Manager is required to notify the operator in the case of designated events.
- The Prime Minister is responsible for issuing a Declaration of a Nuclear Emergency Situation and establishing the Government Countermeasures Headquarters.

ii) Ensuring systematic linkage of national government with local government

- The Nuclear Disaster Prevention Specialist is required to reside in the community where the nuclear facility is located.
- Expert members of staff of national government are assigned to the local government to support the chief of the local government.
- The Government designates an emergency response facility (off-site centre).
- The disaster prevention training jointly conducted by the national and local governments and the operator is based on the programme developed by the national government for this purpose.
- Co-operation of the Nuclear Safety Commission with the Disaster Prevention Committees of the local governments.
- The related local governments, as well as a competent minister, are allowed to collect reports from the nuclear operator and to perform on-the-spot inspections on its facilities to determine whether the nuclear operator is fulfilling all his obligations.

iii) Strengthened national emergency system

- More extensive authority is assigned to the manager of the Government Countermeasures Headquarters so that he can give the necessary directions to the related administrative offices, local governments, nuclear operators and others.
- The main authority is provided to the manager of the on-site countermeasures headquarters by the manager of the Governmental Countermeasures Headquarters.

- The advice of the Nuclear Safety Commission to the manager of the Governmental Countermeasures Headquarters is clearly positioned. In addition, assigning the Nuclear Safety Commission with the investigators for the emergency countermeasure strengthens the disaster countermeasure system.

iv) Identifying the responsibilities of the nuclear operator

- The nuclear operator is obliged to develop its own programme of disaster prevention in order to promptly implement tasks required for prevention and mitigation of nuclear accidents.

In accordance with its disaster prevention programme, the nuclear operators shall establish a Nuclear Disaster Consequences Prevention Organisation which will be responsible for the prevention and mitigation of nuclear disaster at each of its nuclear facilities.

- The nuclear operators shall nominate a Nuclear Disaster Prevention Manager and Deputy Manager at each nuclear facility.
- The nuclear operator shall provide and maintain radiation-measuring equipment.
- An “Off-site Centre” is to be designated in each Prefecture where nuclear installations are located. When a competent minister designates an off-site centre, the nuclear operator shall submit the materials that will be required for implementing emergency countermeasures at the off-site centre.

2. *Subjects which yet remain to be reviewed in relation to the revised Regulation Law and the Special Law on Emergency Preparedness for Nuclear Disaster*

It is highly laudable that two bills were enacted in Japan in a short space of time, where previously there was no single law governing nuclear disasters of such a specific nature. However, there remain subjects yet to be reviewed. For example, according to the revised Regulation Law, the newly established inspection systems for compliance with safety regulations are very extensive, and nuclear safety inspectors may constitute an unjustifiable intrusion into business activities. Although thorough inspections are necessary, a system that would not overly burden operators should be considered.

On the other hand, the Special Law on Emergency Preparedness for Nuclear Disaster does not provide details on countermeasures to be used in respect of incidents such as nuclear fuel transport accidents, destruction of nuclear facilities and nuclear terrorism. Responses to these questions should be discussed further.

Public trust, lost in the wake of the JCO accident, is gradually being restored. It is important for the national and local governments and nuclear operators to fulfil their duties and continue their efforts to ensure nuclear safety.

IV. The referendum at Kariwa-mura for the Plu-Thermal Project

In line with efforts to maximise efficiency in the use of uranium resources, plutonium recovered from reprocessed spent fuel is to be converted into plutonium-uranium mixed oxide (MOX) fuel for conventional nuclear power plants and thus re-used. This is, as mentioned above, the Plutonium-Thermal Project. The final goal of Japan's nuclear fuel cycle policy is to re-use recovered uranium at the Fast Breeder Reactor (FBR). The FBR, however, is still at the research and development stage and is not commercialised yet; therefore this Plu-Thermal Project constitutes a compromise pending further developments in relation to the FBR.

In another blow to Japan's beleaguered nuclear power policy, residents of Kariwa-mura, Niigata Prefecture, voted against a plan to use MOX fuel at a local power plant. More than 50% of the villagers who voted on 27 May 2001 in the nation's first referendum on the use of the controversial fuel opposed the plan. Turnout was 88.14% of the village's 4 090 eligible voters. At issue was the plu-thermal project at the No. 3 reactor of the nuclear power generation plant operated by Tokyo Electric Power Co. (TEPCO), which is located on the border of Kariwa and the neighbouring city of Kashiwazaki.

Such referenda are problematic. The most controversial point is whether or not the results of these referenda are legally binding. The Japanese Constitution is based on indirect democracy. Referenda are employed only in restricted cases as follows:

- voting on special laws applicable to a local government;
- voting on dissolving local assemblies and dismissing public officials; and
- referenda based on municipal bylaws.

Hence, it goes without saying that the results of such referenda do not bind national energy policies or local operator policy.

However, it is hard to imagine that a mayor would take actions running counter to the results of such a referendum. It can be said that while the results of such referenda are not legally binding, they are binding in practice. Moreover, other issues concerning referenda include:

- referenda are not necessarily suitable for resolving issues that require comprehensive and long-term study, or issues that need judgements involving highly specialised technologies;
- these referenda may be influenced more by emotion than by reason, making it possible that people will make irrational decisions;
- when there is only a slight difference between vote tallies, such a close outcome might lead to emotional confrontations;
- it is perhaps not appropriate that the siting of any nuclear power plants, an important aspect of the government's national energy policy, be left to the judgement of the residents of one local government.

Many people have low opinions of the wide use of referenda, but a certain number of people support such a system. In the end, the Kariwa-mura case is assumed to be postponed for now and has been left undecided.

It is possible that another municipal government with a specific plan for the Plu-Thermal Project may hold a referendum and residents could thus express their opinions in the near future.

V. The final disposal of high-level radioactive waste

Since the onset of its nuclear development, Japan has consistently promoted a policy focusing on the establishment of the nuclear fuel cycle, in order to ensure energy security and the most efficient use of resources. The policy includes reprocessing spent fuel arising from nuclear power generation and using plutonium recovered from spent fuel as nuclear fuel. Under this policy, a basic concept has been established, which specifies that high-level radioactive waste (hereinafter referred to as “HLW”) is to be solidified in a stable form (vitrification), and vitrified units are to be stored for cooling for some 30 to 50 years, after which it will be subjected to deep geological disposal.

Thus far, Japanese electric utilities have entrusted overseas contractors in the United Kingdom and France with the reprocessing of spent fuel generated in Japan. The first shipment of vitrified units reprocessed by the overseas contractors returned to Japan in February 1995. The returned vitrified units are now stored at a facility at Rokkasho-mura, Aomori Prefecture for cooling.

Despite the situation as described above, no legal regime governing the entity in charge of HLW final disposal has been established; neither have measures concerning the financing of this final disposal or disposal site selection procedures been developed. Out of the Japanese nuclear-related laws, only the Regulation Law sets out certain conditions regarding disposal and management of low level radioactive waste and off-site interim storage of spent fuel.

It is planned to reprocess spent fuel in Japan at the reprocessing plant which is to be built at Rokkasho-Mura in the near future, as the number of vitrified units is expected to increase steadily over a long period of time. Under the circumstances, it became urgent to develop a legal regime governing the final disposal of HLW in Japan.

The Programme defining the basic concepts governing HLW was established by the Atomic Energy Commission in June 1994. The “HLW Disposal Conference,” established under the AEC, then worked to prepare legislation for HLW final disposal. In 1998, the HLW Disposal Conference issued a report, in which it presented proposals for the preparation of laws concerning the establishment of the implementing entity, assurance of funds, and a disposal site selection procedure. In response to these proposals, the Co-ordination Subcommittee of the Advisory Committee for Energy, which was established under the auspices of the Ministry of International Trade and Industry, prepared a report in March 1999 in which specific issues, such as the estimate of disposal costs, features of the implementing entity, and measures to ensure steady availability of funds, were summarised. Subsequently, legislation was prepared based on these reports, and finally, the Law on Final Disposal of High Level Radioactive Waste (hereinafter referred to as the “HLW Law”) was enacted on 31 May 2000.

The HLW Law represents a revolutionary milestone when looking back more than a decade over the difficulties faced in the course of the legislation. However, there are many legal problems to be solved in further promoting the HLW final disposal project.

The first problem is that the HLW Law does not directly specify safety regulations for implementation of final disposal (Article 20) and dissolution of the Management Organisation (Article 71). The HLW Law specifies that the safety regulations and dissolution of the Management Organisation be defined under another law to be enacted in the future because the final disposal project will last for an extremely long period of time and because uncertainties such as changes in economic conditions and technological developments are expected to occur in the course of the project.

The second problem concerns the existing laws that are expected to apply to the implementation of the final disposal project. The applicability of some of these laws to the HLW final disposal project has not been clarified and amendment of or additions to the existing laws and ordinances may be required. For example, the question of environmental assessment requirements will arise in relation to the effects of changing the landscape and construction of buildings during the final disposal process when site characterisation and construction of the final disposal facilities are conducted. The Environmental Impact Assessment Law sets forth procedures governing environmental assessment. However, this Law, which was enacted in 1997, does not provide for procedures in relation to siting and construction of final disposal facilities. Therefore, related laws and ordinances will need to be prepared in the future.

The third problem is that there are factors lacking in the HLW Law from the legal point of view in proceeding with the final disposal project. For example, the HLW Law does not specify provisions concerning easements or governmental appropriation rights according to the public law when the Management Organisation conducts site characterisation or acquires land for the site and its neighbouring areas. In addition, the HLW Law does not clearly mention the measures, including grants, to promote the development of the sites which are to host the HLW final disposal facilities although such measures are currently undertaken of behalf of local governments that host nuclear facilities.

The HLW Law was a revolutionary milestone that showed national movement towards resolution of the pending problems concerning HLW final disposal. However, in promoting the final disposal project, there are many legal problems to be solved. Beside legal problems, there are a number of difficulties, such as obtaining the consensus of local residents during the site selection stage, in promoting the final disposal project. In this respect, the HLW Law is just a starting point to complete HLW final disposal.

VI. Storage of spent nuclear fuel

Spent fuel from nuclear power plants must be safely stored until it is sent for reprocessing. Up until now, spent fuel in Japan has been stored in storage facilities at each nuclear power plant site (except that which is sent to Britain and France for reprocessing based on a written contract). A commercial-size domestic reprocessing plant is now being constructed, but the construction process has been delayed. Also, it is clear that the capacity of storage facilities at nuclear power plant site is about to reach its limit. Some operators have built extra storage facilities at their sites recently, but it has also been necessary for operators to built storage facilities outside their nuclear power plants.

Therefore, the Regulation Law was revised in June 1999 to allow spent nuclear fuel to be stored outside nuclear power plants until it can be reprocessed. Consequently, this revision made it possible for nuclear power plant operators to set up an “outside storage business” under licence in the same manner as with other nuclear installations. Of course, the licensing process to commence construction

and the safety regulation system for operation and maintenance will be organised in the same way as for other nuclear installations.

Mutsu-Shi in Aomori Prefecture requested that a siting feasibility study be carried out by Tokyo Electric Power Co. (TEPCO) in November 2000. TEPCO is holding briefings of the siting feasibility study for local people and the meteorological observation investigation etc. has been underway since April 2001.

VII. Transportation of nuclear fuel material, etc.

1. Regulations governing transportation

In advancing nuclear power generation, transportation of nuclear fuel and radioactive waste in and out of the country is necessary.

Safety regulations governing the transport of nuclear fuel and radioactive material derive from the IAEA Regulations on Radioactive Material. Regulations governing transport by road and rail are established in the Prevention Act. Regulations governing transport by sea are set out in the Ship Safety Law. As for ocean vessels, regulations are set out by the regulation law of each country, the IAEA Regulations for the Safe Transport of Radioactive Material and international conventions governing transportation.

In addition, when nuclear matter, such as natural or enriched uranium, is transported from the United States, it is regulated under the Agreement for Co-operation between the Government of Japan and the Government of the United States of America Concerning Peaceful Uses of Nuclear Energy (hereinafter referred to as the “Japan-US Nuclear Agreement”).

The former Japan-US Nuclear Co-operation Agreement, which was signed in 1968, had required Japan to obtain advance approval from the US Government for any international transfer of nuclear material of US origin. Under that former Japan-US nuclear agreement, Japanese utilities had to submit “MB-10” applications and obtain shipment-by-shipment approvals from the US Government prior to transporting spent fuel to overseas reprocessors. However, the current Japan-US Nuclear Agreement, which came into force in July 1988, provides for the following:

- Advance approval from the supplier country shall be required for transfer of spent fuel to third countries and transport of recovered plutonium from such countries.
- However, if these transfers are made between specified facilities in accordance with specified requirements and guidelines, such advance approval shall be given on a long-term, predictable and reliable basis (Programmatic Approval).

It is a well-known fact that the international transportation of plutonium can be a target for terrorists. Pursuant to our reprocessing service contracts with BNFL and COGEMA, the recovered plutonium is transported back from the United Kingdom and France to Japan. Therefore, the transport of plutonium requires far stricter protection than that of uranium in its various forms. The existing criteria and associated issues are as follows:

As mentioned above, US advance consent is required for the transport of recovered plutonium back from the United Kingdom and France, if such plutonium is recovered from US-origin spent fuel.

In fact, most plutonium to be recovered in the United Kingdom and France is of US origin. Under the Japan-US Nuclear Agreement, however, Programmatic Approval will be given if recovered plutonium is transported in accordance with the Guidelines set forth in Annex 5 of the Implementing Agreement for the new Japan-US Nuclear Agreement. The Guidelines for air shipment and sea shipment respectively specify the requirements for Programmatic Approval as follows:

Guidelines for Air Shipment

- Use of exclusive cargo-carriers.
- Use of an arctic route or other selected safe routes.
- Presence of armed guard on board.
- Use of crash-proof container.
- 24-hour monitoring of the aircraft by the operation centre.
- Preparation of an emergency plan including the relevant countries en route.

Please note, however, that Japan does not arrange for such shipments by air.

Guidelines for Sea Shipment

- Use of exclusive vessels.
- Use of selected safe routes.
- No transit calls at ports en route, except for emergency.
- Presence of armed guard on board.
- Escort by an armed vessel in principle (this can be avoided only if some alternative security measures effectively compensate for the absence of an armed escort vessel).
- Measures to prevent transfer to another vessel while on the sea.
- 24-hour monitoring of the vessel and the cargo by the operation centre.
- Preparation of an emergency plan including the relevant countries en route.

The most critical point of the Guidelines is, however, the fact that a transportation plan must be prepared involving all relevant parties including the countries en route prior to each shipment.

2. *Current Situation concerning Transportation*

a) *Transportation of nuclear fuel*

In Japan we use low-enriched uranium as fuel for nuclear power generation and almost all of this material is imported. Uranium is enriched at overseas enrichment plants, and then transported by ocean vessels from the US or France to Japan in the chemical form of uranium hexafluoride or uranium dioxide. Upon arrival in Japan, it is transported by road to reconversion plants or fuel fabrication plants. The imported uranium is processed into fuel assemblies under fuel fabrication contracts between the utilities and reactor constructors (or fuel manufacturers), and the fuel assemblies are transported from fuel fabrication plants to nuclear power facilities by road or, in some cases, by sea.

b) *Transportation of spent fuel etc.*

The utilities have reprocessing services contracts with JNC, and transport spent fuel from nuclear power stations to JNC's reprocessing plant at Tokai-mura, Ibaragi prefecture. Furthermore, the utilities also have reprocessing contracts with BNFL in the United Kingdom and COGEMA in France, and contracts for spent fuel transportation with BNFL.

On the other hand, Japan Nuclear Fuel, Ltd. is constructing Japan's first commercial-use reprocessing plant to begin operations in July 2005 in Rokkasho-mura. The spent fuel is to be transported by sea from nuclear power stations to the reprocessing plant.

The Nuclear Fuel Transportation Co. (NFT) is in charge of the domestic transport to JNF's plant while Pacific Nuclear Transportation Limited (PNTL), a company established jointly by companies of Japan, the United Kingdom and France, conducts overseas transport to BNFL and COGEMA. For sea transport, vessels dedicated only for spent fuel shipments are used. They are specially designed with double-hulls, unsinkable structures that can resist damage due to a collision with another vessel.

Transport of high-level radioactive waste which has been reprocessed abroad is done based on an offshore reprocessing consignment contract concluded between the Japanese electric utility and the reprocessing firms in Britain and France. Recently, HLW was transported between December 2000 and February 2001 to Aomori Prefecture Rokkasho-mura following reprocessing in France past Cape Horn in South America by "the Pacific Swan" route. Several nations, including Chile, Argentina, Brazil, and Uruguay, and environmental organisations protested fearing that this would become a fixed route in the future.

It is necessary in the future for the country and the firms carrying out reprocessing activities to consider these transport concerns. This should include an effort to promote understanding and explain safety and emergency measures to the coastal countries en route. Moreover, when the nuclear fuel cycle policy of our country is further advanced in the future, it will be necessary to reconsider the trend for such transport.

VIII. The Nuclear Damage Compensation Law of 17 June 1961 (hereinafter referred to as the “Compensation Law”)

The Compensation Law establishes a national regime governing compensation for nuclear damage. This Law is intended to compensate nuclear damage caused by reactor operation, fuel fabrication, reprocessing, utilisation of nuclear fuel material, storage of spent fuel, and disposal of nuclear fuel material or other material contaminated by nuclear fuel material, conducted by nuclear facility operators.

The compensation regime defined by this Law stipulates that the nuclear facility operators shall be strictly (no-fault) and exclusively liable and that their liability is unlimited. Operators are obliged to take out measures to cover their liability including the conclusion of a liability insurance contract and an indemnification contract with the government.

The Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, adopted under the auspices of the IAEA in 1997, defined the international guidelines according to which the minimum amount of operator liability should be increased from USD 5 million to 300 million Special Drawing Rights (SDRs) (approximately JPY 50 billion). Accordingly, a review of operator liability was initiated in Japan and an amendment to the Nuclear Damage Compensation Law was adopted in April 1999.

Japan is not a party to the Vienna Convention. The reason why Japan has not expressed interest in acceding to this Convention is that the number of parties is not enough and the level of liability is insufficient, and more specifically, it has been pointed out that the limitation of liability established in this Convention conflicts with the unlimited liability regime in the Japanese Compensation Law.

However, circumstances have gradually changed. Namely, the number of parties to the Vienna Convention has increased little by little, and several more states are showing interest in the Convention. Furthermore, in the Protocol to Amend the Vienna Convention, conflicts between the limited liability regime and unlimited liability regimes have been intentionally avoided. Also, in 1997, the Convention on Supplementary Compensation for Nuclear Damage was adopted.

The development and use of atomic energy in Asia is expected to progress tremendously in the near future. In order to promote the sound development and use of nuclear energy and to ensure rapid and efficient remedies for victims of nuclear incidents in an emergency, it is desirable to consider participation in any international framework for compensation for nuclear damage through ratification of international conventions or by other means, and to form regional frameworks in the area around Japan.

IX. Conclusion

In this report, I introduced the present situation of nuclear power in Japan, including various problems that the government and electric power companies are facing, especially with respect to laws and regulations. In addition to these problems, we cannot forget deregulation concerning electric utilities.

It is thought that the role which nuclear power generation should play in the future is a large one from the point of view of the stability of fuel supply and the prevention of global warming. But can nuclear power generation compete effectively in terms of cost? Are there some changes in the nuclear power programme policy of the government in relation to the liberalisation of the power market?

Moreover, there are still numerous problems relating to the possibility of securing cost-effective safety measures for nuclear power generation.

However, we assume that we will continue to promote nuclear power while addressing these problems in Japan.