Convention on Nuclear Safety National Report of Japan for the Fourth Review Meeting

September, 2007

Government of Japan
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<th>Description</th>
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<tbody>
<tr>
<td>ABWR</td>
<td>Advanced Boiling Water Reactor</td>
</tr>
<tr>
<td>ACNRE</td>
<td>Advisory Committee for Natural Resources and Energy</td>
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<tr>
<td>AEC</td>
<td>Atomic Energy Commission</td>
</tr>
<tr>
<td>AESJ</td>
<td>Atomic Energy Society of Japan</td>
</tr>
<tr>
<td>ALARA</td>
<td>as low as reasonably achievable</td>
</tr>
<tr>
<td>ANRE</td>
<td>Agency of Natural Resources and Energy</td>
</tr>
<tr>
<td>APWR</td>
<td>Advanced Pressurized Water Reactor</td>
</tr>
<tr>
<td>BSS</td>
<td>Basic Safety Standards</td>
</tr>
<tr>
<td>BWR</td>
<td>Boiling Water Reactor</td>
</tr>
<tr>
<td>Comprehensive Check</td>
<td>Comprehensive Check of Electric Power Facilities</td>
</tr>
<tr>
<td>DNB</td>
<td>Departure from Nucleate Boiling</td>
</tr>
<tr>
<td>Dose Limit Notification</td>
<td>Notification for Dose Limits on the basis of the Rules for Commercial Power Reactors</td>
</tr>
<tr>
<td>Electric facility</td>
<td>Facility or equipment that is installed for power generation, transformation, supply, distribution and utilization</td>
</tr>
<tr>
<td>ERSS</td>
<td>Emergency Response Support System</td>
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<tr>
<td>FY</td>
<td>Fiscal Year</td>
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<tr>
<td>IAEA</td>
<td>International Atomic Energy Agency</td>
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<tr>
<td>ICRP</td>
<td>International Commission on Radiological Protection</td>
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<tr>
<td>INES</td>
<td>International Nuclear Event Scale</td>
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<tr>
<td>INPO</td>
<td>Institute of Nuclear Power Operations</td>
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<tr>
<td>IRRS</td>
<td>Integrated Regulatory Review Service</td>
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<td>JAEA</td>
<td>Japan Atomic Energy Agency</td>
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<td>JANTI</td>
<td>Japan Nuclear Technology Institute</td>
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<tr>
<td>JCO Criticality Accident</td>
<td>Criticality Accident at JCO Co. Uranium Fuel Fabrication Facility</td>
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<tr>
<td>JEA</td>
<td>Japan Electric Association</td>
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<tr>
<td>JEAC(G)</td>
<td>Japan Electric Association Code (Guideline)</td>
</tr>
<tr>
<td>JNES</td>
<td>Japan Nuclear Energy Safety Organization</td>
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<tr>
<td>JPDR</td>
<td>Japan Power Demonstration Reactor</td>
</tr>
<tr>
<td>JSME</td>
<td>Japan Society of Mechanical Engineers</td>
</tr>
<tr>
<td>LCO</td>
<td>Limiting Conditions for Operation</td>
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<tr>
<td>METI</td>
<td>Ministry of Economy, Trade and Industry</td>
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<tr>
<td>MEXT</td>
<td>Ministry of Education, Culture, Sports, Science and Technology</td>
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<tr>
<td>Minister of METI</td>
<td>Minister of Economy, Trade and Industry</td>
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<td>Minister of MEXT</td>
<td>Minister of Education, Culture, Sports, Science and Technology</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
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<tr>
<td>MITI</td>
<td>Ministry of International Trade and Industry (METI at present)</td>
</tr>
<tr>
<td>MLIT</td>
<td>Ministry of Land, Infrastructure and Transportation</td>
</tr>
<tr>
<td>Monju</td>
<td>Prototype fast breeder reactor owned by JAEA</td>
</tr>
<tr>
<td>MOX</td>
<td>Mix Oxide</td>
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<tr>
<td>NISA</td>
<td>Nuclear and Industrial Safety Agency</td>
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<td>NISS</td>
<td>Nuclear and Industrial Safety Subcommittee</td>
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<tr>
<td>NSC</td>
<td>Nuclear Safety Commission</td>
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<tr>
<td>NS Network</td>
<td>Nuclear Safety Network</td>
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<tr>
<td>NTC</td>
<td>Nuclear Power Training Center</td>
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<tr>
<td>NUSS</td>
<td>Nuclear Safety Standards, IAEA</td>
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<tr>
<td>OECD/NEA</td>
<td>Organization of Economic Co-operation and Development/Nuclear Energy Agency</td>
</tr>
<tr>
<td>OSART</td>
<td>Operational Safety Assessment Review Team</td>
</tr>
<tr>
<td>PAZ</td>
<td>Precautionary Action Zone</td>
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<tr>
<td>PSA</td>
<td>Probabilistic Safety Assessment</td>
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<tr>
<td>PSR</td>
<td>Periodic Safety Review</td>
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<tr>
<td>PWR</td>
<td>Pressurized Water Reactor</td>
</tr>
<tr>
<td>QA</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>R &amp; D reactor</td>
<td>Power reactors at the stage of research and development</td>
</tr>
<tr>
<td>Reactor Regulation Law</td>
<td>Law on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors</td>
</tr>
<tr>
<td>SCC</td>
<td>Stress Corrosion Cracking</td>
</tr>
<tr>
<td>Special Law for Nuclear Emergency</td>
<td>Special Law of Emergency Preparedness for Nuclear Disaster</td>
</tr>
<tr>
<td>RM</td>
<td>Relationship Management</td>
</tr>
<tr>
<td>SCAP</td>
<td>Stress Corrosion Cracking and Cable Ageing Project</td>
</tr>
<tr>
<td>SSC</td>
<td>Structures, Systems and Components</td>
</tr>
<tr>
<td>UPZ</td>
<td>Urgent Protective Action Planning Zone</td>
</tr>
<tr>
<td>WANO</td>
<td>World Association of Nuclear Operators</td>
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</table>
Preface

1. Preparation of the Report

Organizations involved in the report preparation

This report was prepared by the Nuclear and Industrial Safety Agency (hereinafter referred to as “NISA”) of the Ministry of Economy, Trade and Industry (hereinafter referred to as “METI”). It was prepared in consultation with the relevant government agencies, as well as in the support of the Incorporated Administrative Agency Japan Nuclear Energy Safety Organization (hereinafter referred to as “JNES”) and with the cooperation of Japan Nuclear Technology Institute. Moreover, the report was deliberated by the Nuclear and Industrial Safety Subcommittee of the Advisory Committee for Natural Resources and Energy under METI and it also reflects the opinion of the Nuclear Safety Commission.

Items to be considered in preparation of this report

In preparation of this report, special attention was paid to respond appropriately to the items for which reporting was recommended in the “Summary Report” of the 3rd Review Meeting(RM), questions on the previous report of Japan raised by other Contracting Parties, and also items presented as questions or comments to the reporting of Japan in the 3rd RM.

Fundamental policies of the descriptions of this report

In composing this report, results of implementation by the national government and industry were inserted corresponding to each article of the previous report, and description of it without any alteration was concisely duplicated so that the whole aspect of the present framework for ensuring safety could be understood. However, concerning the operating experience, which is actual evidence for ensuring the safety and improvement of nuclear installations, only operating experience of three years after the 3rd review meeting (in April 2005) were provided as the subject of this report, so as to avoid duplication of the last report.

Description style of this report

In description of style, content revisions from the last report are shown in italics and where no changes were made the script remains as in the original (including editorial amendments). This is so that the reader can easily identify the revisions corresponding to the three years after the 3rd RM.

Under the legislative and regulatory framework of Japan, nuclear installations in the scope of this Convention (land-based commercial nuclear power stations) correspond to commercial power reactors and power reactors at the stage of research and development, of which the safety regulations for these two types of nuclear installations are fundamentally the same. For this reason, detailed description in this report is focused on the commercial power reactors as examples, which have plenty of experience with siting, design, construction and operation, etc.
In addition, the response to “SYNOPSIS OF THE RELEVANT IAEA SAFETY REQUIREMENTSTATEMENTS REFLECTING THE ISSUES ADDRESSED BY ARTICLES 6 TO 19 OF THE CONVENTION ON NUCLEAR SAFETY” is provided in Appendix 5 of this report.

2. Current Status of Nuclear Energy Utilization in Japan

(1) Situation of utilization of nuclear energy in general

Currently, there are a total of 56 nuclear installations in Japan in the scope of the Convention, which include 55 units in operation and one unit under construction that has attained criticality. They have become the main power source supplying about 30.6% of the electric power production in the 2006 fiscal year.

In the Framework for Nuclear Energy Policy decided by the Cabinet in October 2005, it is stated that the basic concepts of nuclear power generation is 1) aiming to maintain or increase the current level (around 30 to 40%) of electric power production in 2030 or later, 2) promote nuclear fuel cycles, 3) utilize fast breeder reactors, etc. METI deliberated concrete measures to realize these basic concepts, and adjusted the Nuclear Power National Plan in August 2006. This plan was determined to be promoted intensively and to 1) realize construction of new and additional nuclear power stations even under the circumstances of deregulation of the power industry, 2) utilize the established nuclear power stations by ensuring safety into its major premises, 3) put the Fast Breeder Reactor Cycle into commercial use in as early a date as possible, 4) secure quantity and quality of the technical human resources to sustain the next generation, 5) support industries for the export of the nuclear power generation facility, 6) participate positively in making an international framework with the aim to coexist with expansion of nuclear power generation and nuclear nonproliferation, etc.

(2) Current Status of Nuclear installations in Japan

As of August 2007, there are a total of 56 nuclear installations in Japan in the scope of the Convention, which include 55 units in operation and one unit under construction that has attained criticality.

In FY 2006, the total capacity of 49.47GWe of nuclear power generation accounted for about 20.7 percent of the nation’s total capacity of electricity generation, and nuclear power generated 304.5 billion kWh of electricity that was about 30.6 percent of 995.9 billion kWh electricity generated in Japan. The average annual capacity factor of nuclear power plants is 70%. The average unscheduled shut-down frequency over FYs 2004 to 2006 was as small as 0.5 times per reactor-year.

3. International Activities for Ensuring Safety of Nuclear installations

Recognizing that international cooperation is essential for ensuring safety of nuclear installations, Japan has been promoting multilateral and bilateral cooperation.
As for multilateral cooperation, Japan has actively participated in the information exchange on safety regulation and study of issues concerning nuclear safety in the IAEA, the Organization for Economic Cooperation and Development/Nuclear Energy Agency (OECD/NEA), and furthermore, the International Nuclear Regulators Association (INRA) and the International Nuclear Safety Group (INSAG). The obtained information and the study results have been utilized for the substantial regulation of Japan.

A new international activity during this reporting period is that Japan participated in the second review meeting of the “Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.” This led Japan to have opportunities to receive peer-reviews of the contracting parties on the safety of radioactive waste management etc. as well as on the safety of nuclear installations. As for bilateral cooperation, Japan has been exchanging regulatory information on nuclear safety with the regulatory authorities of China, France, Korea, Sweden, the U.K. and the U.S.A. under the bilateral agreement, has shared its knowledge and experience with them and has been making efforts to enhance the safety of each other’s nuclear power plants.

On the other hand, licensees are also cooperating actively in managing the World Association of Nuclear Operators (WANO) Tokyo Center, in order to enhance the safety and reliability of the operation of nuclear power stations through the information exchange between utility operators of Asian nations.

Units 3 and 6 of the Kashiwazaki-Kariwa Nuclear Power Station of TEPCO invited the OSART of IAEA in November 2004.

4. Important Matters during Reporting Period

Revision of the Regulatory Guide for Reviewing Seismic Design

The Regulatory Guide for Reviewing Seismic Design of Nuclear Power Reactor Facilities to new nuclear reactors was revised by the Nuclear Safety Commission on September 19, 2006. It requires a higher level of seismic safety resulting from the alternation of the formulation and evaluation method of earthquake ground motion etc. NISA, deciding that the seismic safety should be checked based on the new Guide for the existing nuclear installations, instructed the operators (the licensees of all the nuclear power reactors) to conduct the seismic safety evaluation and to report the results to on September 20, 2006.

Activities of the Task Force on Inspection System

While promoting firm establishment of the new inspection system which was introduced in October 2003, the Task Force on Inspection System had resumed in November 2005, in order to ensure the safety of the aged nuclear power station, and the report, “Improvement in the Inspection System for Nuclear Power Generation Facilities,” was issued in September 2006. The main points are (1) to encourage the licensees to conduct their maintenance activities
reflecting the individual characteristics of each nuclear installation with emphasis on aging management, (2) to strengthen the operational safety activities by including the inspection during reactor operation in addition to the activities performed during reactor shutdown, and (3) to include thorough remedial actions into the inspection system and to avoid non-conformity by the licensees

**Stipulating performance-code of the technical standard**

Heretofore, the technical standard which defines technical requirements of the nuclear installations included and not only items related to performance but also provisions which define detailed specifications. In order to enable flexible response to technical innovations or latest knowledge, the technical standard should be focused only to the performance requirements necessary for ensuring safety, and the academic society and association standards should be utilized as detailed specifications which meet the performance requirements.

**Promotion of safety research**

NISA established the Nuclear Safety Infrastructure Subcommittee for ensuring nuclear safety under the Nuclear and Industrial Safety Subcommittee in July 2006, and developed the framework for industries and regulatory organizations to perform planning, implementation and evaluation of the nuclear safety infrastructure study program. The subcommittee prepared the roadmap of the nuclear safety infrastructure study program so that the program could be implemented in a well-planned and efficient manner towards ensuring safety. In addition, considering that many research facilities for nuclear safety studies are on a global scale in the crisis of possible shutdown in recent years, it has been proposed that the Japan Materials Testing Reactor (JMTR) of the Japan Atomic Energy Agency is to be positioned strategically as an essential facility for the safety infrastructure study program. It is decided that the international joint study should also be strongly promoted. For example, the special fund business SCAP project, which reviews stress corrosion cracking (SCC) and the aging of cables, was entrusted from Japan to OECD/NEA.

**Establishment of the Japan Nuclear Technology Institute**

In April 2005, the nuclear industry (licensees, nuclear fuel fabricators, plant manufacturers, etc.) established the Japan Nuclear Technology Institute (JANTI) who is actively encouraged to further improve the voluntary safety activities by the industry and to share and upgrade the safety culture. Objectives of JANTI are (1) to act for the safety-culture dissemination in support of licensees, (2) to perform peer review to the activities of licensees, (3) to analyze and evaluate information from the Nuclear Information Archives “NUCIA” etc., and (4) to evaluate the safety culture of the members objectively with the third-party’s view-points.

**Measures for aging management**

Implementation of Technical Assessment of Aging and development and implementation of the Ten Years Maintenance Program were defined as requirements for aged nuclear installations.
in laws and ordinances of October 2003. NISA has been confirming their implementing status.

In order to enhance the response to aged nuclear installations, NISA formed the Technical Information Coordination Committee to share domestic and foreign technical information among the industrial society, the academic society and the government organizations, and to utilize them effectively. In addition, the Special Committee was established under the Atomic Energy Society of Japan, with the participation of NISA, JNES, universities, research organizations, power utilities, nuclear plant manufacturers and plant engineering companies. And a road map to the measures for aging management and life-extension with safe-operation of light water reactors was developed by the Special Committee.

Securing human resources in the nuclear field

In Japan, sustaining human resources becomes one of the key issues, due to the retirement of expert engineers and decreasing construction opportunities of nuclear installations in recent years. Consequently, the securing human resources in the future have been reviewed and the national government and the industrial and academic societies are working together for personnel training and succession of technical tradition.

Comprehensive check of the electric power facilities

The data falsification in the hydroelectric power station of The Chugoku Electric Power Co., Inc. in October 2006 led to the implementation of the Comprehensive Check of electric power facilities including hydroelectric power, thermal power and nuclear power stations. As a result, 316 cases on the whole, of which 98 cases were of nuclear power, of falsification and procedural defect were discovered and reported by 12 electric power companies in March 2007.

METI responded to the cases of nuclear installations by (1) invoking the order to the nuclear power stations of Tokyo Electric Power Co., Inc., Hokuriku Electric Power Co., The Chugoku Electric Power Co., Inc., and The Japan Atomic Power Co. to amend their Operational Safety Programs, (2) moving forward or extending the Periodic Inspections of the nuclear power stations of these electric power companies, (3) implementing special Operational Safety Inspections and Periodic Inspections with the assignment of the Special Nuclear Installation Management Supervisor, (4) promoting information sharing on international accidents and troubles, and (5) directing planning of an action plan for the prevention of recurrence.

The action plan for the prevention of recurrence was submitted from each electric power company to METI. The main base examples include participation of the executive officers, intensive education program on operational safety, recordkeeping of alarm typewriters, cooperation with free access of Nuclear Safety Inspectors, enhancement of independency of the chief engineer of reactors, promotion of information sharing through the NUCIA etc., notification of deviations from limiting conditions for operation, information sharing between electric power companies, etc. NISA determined that these action plans are appropriate in general, and they will verify the situation through the Operational Safety Inspection etc. in the future. Moreover, NISA will also revise the required legislation corresponding to enforcement
of the action plan.

Receiving the report from NISA about the falsification and concealment concerning nuclear facilities, the NSC has investigated and has tried to understand the whole story. Responding to the actions taken by METI, the NSC determined “Actions to take, concerning the malicious conduct of unreported alteration and concealment at nuclear facilities” (See Attachment to the report on Article 6) on April 23, 2007.

**Invitation of IRRS**

NISA and the NSC requested the Integrated Regulatory Review Service (IRRS) of the IAEA in 2007. The main objectives of the conventional review by the International Regulatory Review Team (IRRT) was the verification of conformance with the safety standards of the IAEA, the IRRS to Japan included, in addition to that, extensive policy dialogue with the participating senior regulators about current issues on regulation. A preparatory meeting was held in February 2007 and the IRRS plenary meeting was held in June of the same year.

**Niigataken Chuetsu-oki Earthquake**

On July 16, 2007, a magnitude 6.8 earthquake occurred offshore Chuetsu, in Niigata Prefecture about 16 km away from the Kashiwazaki Kariwa nuclear power station of Tokyo Electric Power Co., Inc. Units 2, 3, 4 and 7, which were in operation, automatically shut down with the scram signal due to this earthquake. Units 1, 5 and 6, which were in shutdown for the Periodic Inspection.

After this earthquake, a very little amount of radioactive material was released through the discharge path to the sea in Unit 6 and from the vent stack to the air in Unit 7. The released amount of activity was $9 \times 10^4$ Bq ($2 \times 10^{10}$ Bq/cm$^3$, limit defined by law: 0.2 Bq/cm$^3$) to the sea and $4 \times 10^8$ Bq ($2 \times 10^7$ mSv, limit defined by law: 1 mSv/year) into the air, respectively. It was much less than the limit defined by law, and resulted in no significant radiation exposure to the public. Tokyo Electric Power Co., Inc. is investigating the impact on the equipment, etc. in the power station by this earthquake (as of the end of July 2007).

NISA accepted the IAEA investigation team, in order to achieve international information sharing of the impact of this earthquake on the nuclear power station.

Moreover, the Investigation/Response on Offshore Chuetsu Earthquake Subcommittee was established under the Nuclear and Industrial Safety Subcommittee of the Advisory Committee for Natural Resources and Energy in order to investigate the specific impact on the Kashiwazaki Kariwa nuclear power station by this earthquake and also examine issues to and responses to be addressed to improve safety after this earthquake by the national government and the licensee.

The NSC commissioners, immediately after the earthquake, had visited the site and carefully observed the plants. The NSC received the report from NISA, held a meeting of the “Investigation Project Team on Seismic Safety of Nuclear Facilities” and worked for fact
finding, trying to deliberate future actions. On July 30, 2007, the NSC determined the viewpoint about the impact of this earthquake and the action plans and published the report “The NSC views on, and future actions to take for, the impacts due to the Niigata-ken Chuetsu-oki Earthquake in 2007” (See Annex 4 of this National Report).
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A. General Provisions
Article 6 Existing Nuclear Installations

Each Contracting Party shall take the appropriate steps to ensure that the safety of nuclear installations existing at the time the Convention enters into force for that Contracting Party is reviewed as soon as possible. When necessary in the context of this Convention, the Contracting Party shall ensure that all reasonably practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation. If such upgrading cannot be achieved, plans should be implemented to shut down the nuclear installation as soon as practically possible. The timing of the shut-down may take into account the whole energy context and possible alternatives as well as the social, environmental and economic impact.

There are a total of 56 nuclear installations in Japan in the scope of the Convention as of the end of June 2007, which include 55 units in operation and one unit under construction that has attained criticality.

Since the previous report, Unit 5 of the Hamaoka Nuclear Power Station, Chubu Electric Power Co. Unit 1 of the Higashidoori Nuclear Power Station, Tohoku Electric Power Co., Inc. and Unit 2 of the Shika Nuclear Power Station, Hokuriku Electric Power Co., which were under construction, have attained criticality and they enter the scope of the Convention. The decommissioning plan of Fugen that had been under preparation for decommissioning has been authorized and the plant has come out of the scope of the Convention.

Matters on ensuring safety for existing nuclear installations are described in the following.

In addition, for reference, a list of accidents and failures reported since the previous report is shown in Table 6-1 together with the INES evaluation results.

6.1 Existing Nuclear Installations in the Scope of this Convention

There are a total of 56 existing nuclear installations in Japan in the scope of the Convention as of the end of June 2007. The breakdown is shown in the following:

<table>
<thead>
<tr>
<th>Type</th>
<th>Status</th>
<th>Number of units</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial power reactor</td>
<td>Boiling water reactor (BWR) in operation</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Pressurized water reactor (PWR)</td>
<td>in operation</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Power reactor in research and development stage</td>
<td>under construction*</td>
<td>1</td>
<td>Monju</td>
</tr>
</tbody>
</table>

* Unit under construction, which has attained criticality

The existing nuclear installations are listed in Annex 1, and their locations are shown in Fig.
6-2. The Safety of Existing Nuclear Installations

Major studies and measures implemented for ensuring safety of existing nuclear installations since the previous report are; 1) measures taken for the secondary-system pipe rupture accident at Unit 3 of the Mihama Power Station (the event was partly reported in the report for the 3rd review meeting and at the review meeting), 2) measures taken for the crack etc. of the hafnium-plate-type control rods of BWR nuclear power plants, 3) measures taken for the strainer plugging issue in BWR and the containment sump clogging issue in PWR, 4) measures taken for falsification of the test data on the feed water flow instrumentation, 5) safety review and assessment of power plants loading mixed-oxide fuel partially in the core, 6) measures taken for faulty design of the ABWR turbine blades, 7) check on the status of implementing the measures against sodium leakage of the Monju power station, 8) check on seismic safety of the Onagawa Nuclear Power Station, 9) measures taken for the partial omission of Periodic Inspections conducted by the Incorporated Administrative Agency, Japan Nuclear Energy Safety Organization, 10) implementation of the Comprehensive Check on power generation facilities, etc.

These cases are summed up as below.

(1) Measures Taken for the Secondary-System Pipe Rupture Accident at Unit 3 of the Mihama Power Station

1) Summary of the Accident and Investigation Results

On August 9, 2004, at Unit 3 of the Mihama Power Station, the Kansai Electric Power Co., Inc (hereinafter referred to as "KEPCO"), a main condensate pipe ruptured during the steady-state of operation at rated thermal power, discharged secondary-system steam in the turbine building. Workers near the ruptured opening were exposed to the discharged steam, and five persons died and six persons got injured.

The Nuclear and Industrial Safety Agency (hereinafter referred to as "NISA"), aiming at an investigation of cause and prevention of recurrence of a similar accident, established an accident investigating committee immediately after the accident and compiled the final report on March 30, 2005.

The direct cause of the accident was wall thinning of the pipe concerned due to erosion and corrosion, overlooked for years since KEPCO and Mitsubishi Heavy Industries (hereinafter referred to as "MHI") had not included the ruptured pipe section in the checklist, and the root cause was the inadequacy of the maintenance management and quality assurance system of these business operators.

The efforts made by NISA and the Nuclear Safety Commission (hereinafter referred to as "the NSC") for this case is described in the following.
2) Action by the Nuclear and Industrial Safety Agency

(a) Establishment of the Accident Investigating Committee (the Investigating Committee for the Secondary-System Pipe Rupture Accident at Unit 3 of the Mihama Power Station)

On August 10, 2004, the Accident Investigating Committee was established under the Reactor Safety Subcommittee (it has held the meeting 11 times henceforth).

On September 27, 2004, the interim report was compiled and the special Operational Safety Inspection by NISA and the strict Audit of Licensee's Periodic Check System by the incorporated administrative agency, Japan Nuclear Energy Safety Organization (hereinafter referred to as “JNES”) of the licensee were implemented based on the report.

On March 30, 2005, the final report was compiled.

On March 28, 2006, the implementation status of the measures to prevent recurrence was evaluated (the Investigating Committee meeting was held).

(b) Administrative Actions against Licensees concerning the Secondary-System Pipe Rupture Accident at Unit 3 of the Mihama Power Station

- In September 2004, under the name of the Minister of Economy, Trade and Industry (hereinafter referred to as the "Minister of METI"), a severe warning in writing, the order for conformity to technical standards concerning Unit 3 of Mihama Power Station and a notification to downgrade the evaluation of the Audit of Licensee's Periodic Check System were issued to the Kansai Electric Power Co., Inc.

- The Minister of METI directed JNES to perform a strict review at the Audit of Licensee's Periodic Check System of the nuclear power stations of the Kansai Electric Power Co., Inc.,

- The Director General of NISA issued a notification to licensees other than the KEPCO, to inform his strong expectation to reflect the accident in their preventive actions.

(c) Implementation of the special Operational Safety Inspection (from the 3rd calendar quarter, 2004 to the 4th calendar quarter, 2005)

In order to comprehensively confirm the implementation of the measures to prevent recurrence, the inspection was carried out with the inspection system fully enhanced by inter-changing the inspectors of the Nuclear Safety Inspector's Offices of NISA in the Wakasa area and dispatching the Nuclear Safety Inspectors of NISA. Moreover, on July 1, 2005, the Regional Nuclear Safety General Manager (in charge of the Wakasa area) was newly assigned, and the subsequent inspections were conducted with the General
Manager involved in it.

(d) Confirmation by the Usual Operational Safety Inspection (from the first quarter, 2006)

During the usual Operational Safety Inspection conducted by the Mihama Nuclear Safety Inspector's Office of NISA, the implementing status of the measures to prevent recurrence of the accident has been confirmed. In addition, for the matters beyond the responsibility of the Mihama Power Station, and which is under the responsibility of the Nuclear Power Division, KEPCO Head Office, confirmation was carried out by the inspectors from three offices; namely, the Takahama Nuclear Safety Inspectors Office, Mihama Nuclear Safety Inspectors Office and Ohi Nuclear Safety Inspectors Office, and the Regional Nuclear Safety General Manager.

(e) Confirmation by the Nuclear Maintenance Confirmation Committee (established inside KEPCO on June 17, 2005)

NISA participates as an observer in the Nuclear Maintenance Confirmation Committee, which is an internal audit system of KEPCO, and consists of third-party members, and checks implementation of the measures to prevent recurrence.

(f) Confirmation of the measures to prevent recurrence of MHI

NISA has checked the status of the measures to prevent recurrence of MHI by periodic hearing (about once / quarter) since August 29, 2005.

The measures to prevent recurrence of MHI has been already implemented, since it is required to steadily promote the evaluation and improvement of activities, NISA keeps a close watch on MHI's measures to prevent recurrence whether or not they have autonomously implemented checking of the improvement status of the procurement control by KEPCO.

3) The action status by the NSC

The NSC, immediately after the occurrence of the accident, held an extra conference, to investigate the outline of the accident, and, in order to help in the response to be taken, compiled a report, "Accident at Unit 3 of the Mihama Nuclear Power Station of KEPCO" In order to investigate and review the technical matters etc. for ensuring safety of the secondary-system piping of nuclear installations, the Subcommittee on the Secondary System Piping Rupture at Unit 3 of the Mihama Nuclear Power Station was established under the Special Committee on Analysis and Evaluation of Nuclear Accidents and Failures, and the final report was compiled on April 28, 2005. The Accident Investigation Subcommittee received the accident investigation progress reports from NISA, compiled the items to be followed, and the views of the NSC, and informed NISA of them.
In addition, the NSC reviewed the responses taken by the government agencies for the accident of Unit 3 of the Mihama Power Station, through the "Subsequent regulation reviews" of regulatory body's programs concerning the regulations of periodic licensee's inspections of commercial nuclear power generating facilities and the "Subsequent regulation reviews" of the regulatory body's programs concerning the quality assurance in safety preservation activities at the operating commercial nuclear power generating facilities and the NSC presented their own opinion in a written report issued in February 2005.

Also, the NSC conducted the "Subsequent regulation reviews" of the regulatory body's checking actions for recurrence prevention concerning the secondary piping rupture accident of Unit 3, Mihama Nuclear Power Station, The Kansai Electric Power Company, Inc. They checked the system of the government agencies to confirm implementation status of the measures to prevent recurrence of the KEPCO, and compiled the report in March, 2006.

4) Events Associated with the Accident and the Measures Taken

Through the investigation of the rupture accident due to wall thinning of the secondary-system piping of the Mihama Unit 3, the importance of the maintenance management of aged plants and the necessity of measures taken for degradation of the organizational climate are recognized, and the measures for those issues have been improved and enhanced (refer to Section 14.3). The steam, which discharged at the accident, spread into the central control room, which revealed that the air-tightness of the central control room was inadequate. Therefore, the habitability of the central control rooms is currently under study (refer to Section 18.7).

(2) Measures Taken for the Crack etc. of the Hafnium-Plate-Type Control Rods of BWR Nuclear Power Plants

In January 2006, cracks of the hafnium-plate-type control rods in-service were found at Unit 6 of the Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Co., Inc (hereinafter referred to as “TEPCO”), and the licensee reported the event to NISA. NISA informed the licensees who own BWRs (hereinafter referred to as the "BWR licensees") of the investigation and the report of the results on the usage of the same-type control rods, on the operability of the same-type control rods in reactors during shutdown.

In February 2006, NISA, as a result of the evaluations of the above-mentioned reports, informed the BWR licensees using the same-type control rods to use them in the fully-inserted positions to avoid any potential of not being able to insert them due to cracks, when they are to be used until their neutron irradiation reaches more than a certain level. (The subject units, as of the end of March 2006, are the following 23 nuclear reactors using the same-type control rod; Tsuruga Unit 1, Higashidori Unit 1, Onagawa Units 1, 2 and 3, Fukushima Daiichi Units 2, 3, 4, 5 and 6, Fukushima Daini Units 1, 2, 3 and 4, Kashiwazaki Kariwa Units 1, 2, 3 and 6, 6-5
NISA received the reports from TEPCO and Chubu Electric Power Co., Inc (hereinafter referred to as “Chubu”) concerning the causes analysis and countermeasures for hafnium-plate-type control rods on which the cracks were found in the in-service or spent control rods in May 2006. In response to this, NISA publicly released the NISA's investigation report, and directed to perform a visual inspection of all same-type control rods at the annual periodic licensee's check as short-term measures. In addition, NISA and licensees identified the issues to be studied for medium- to long-term. These measures were reported to the Working Group for Accident and Failure Countermeasures, Subcommittee for Nuclear Emergency Preparedness of the Nuclear and Industrial Safety Subcommittee and the NSC.

(3) Measures Taken for the Strainer Plugging Issue in BWR and the Containment Sump Clogging Issue in PWR

In June 2004, concerning the issue that the recirculation function of the emergency core cooling system could be affected by the plugging of the strainers or by containment sump screen clogging during a loss of reactor coolant accident of BWRs and PWRs, NISA, as a result of this study based on an overseas review status, directed licensees to make a report of investigation on as-build status of thermal insulation etc about BWRs and PWRs and evaluation results on the effectiveness of strainers or screen about BWRs.

In April 2005, the investigation results on the thermal insulation etc. of BWRs and PWRs and interim measures such as a revision of operation procedures, were reported by several licensees. NISA considered that the interim measures reported by the licensees were adequate as they were equivalent in content to the measures of which effectiveness was verified in the U.S.A. NISA considers that full implementation of the interim measures are essential in order not to cause an important-to-safety problem until the measures on the equipment, such as larger strainers or screens etc., will be completed, and NISA instructed the licensees to implement the interim measures and has been checking the implementation status by the Operational Safety Inspection etc. For the effectiveness evaluation of the strainers of BWRs, it was reported that the effectiveness was not confirmed at some nuclear installations as a result of a conservative evaluation in accordance with the U.S. regulatory guides. NISA studied the adequacy of those evaluations and measures at the Working Group for Safety Assessment, of the Nuclear Reactor Safety Subcommittee, under Nuclear and Industrial Safety Subcommittee. As NISA, receiving the results that the larger strainers and replacement of the thermal insulation are required, instructed in October 2005, to implement the measures for BWRs, All BWR licensees have been implementing the measures in accordance with the instruction. This status of implementation was also reported to the NSC.

In October 2005, NISA instructed PWR licensees to submit reports on the result of the effectiveness evaluation of the PWR screens by August 2006. In August 2006, proposed measures for the equipment of each plant and responses to the effectiveness evaluation methods were all submitted and reported to the Working Group, and in May 2007, it was concluded these measures were necessary to be implemented.
(4) Measures Taken for the Falsification of Full-Flow Test Data on Feed Water Flow Instrumentations

NISA, on receipt of an in-house whistle-blowing on November 15, 2005: "almost entire full-flow certification examination data on the reactor feedwater flow instrumentation of Toshiba Corporation were falsified", investigated ten nuclear reactors of TEPCO and Tohoku Electric Power Co., Inc., using the flow instrumentations made by the company. As a result, it was confirmed that the fraudulent correction had been made on the test data of feed water flow instrumentations supplied to three units of both licensees. But, NISA determined after its evaluation that there was no safety or legal issue involved due to the inaccuracy of the feed water flow instrumentations.

NISA ordered Toshiba Corporation to conduct a thorough root cause analysis and to report the recurrence-preventing measures established based on the analysis results in order to never make such a falsification again. NISA requested of TEPCO and Tohoku Electric Power Co., Inc., to establish measures for quality assurance, of procurement for prevention of recurrence and to then report them. NISA conducted the on-site inspection at Toshiba Corporation, in accordance with the Reactor Regulation Law in June, October and December 2006, in order to confirm the implementation status of the recurrence-preventing measures.

(5) Safety Review and Assessment of Power Plants Loading Mixed-Oxide Fuel Partially in the Core

On this matter, the Genkai Units 3 (Kyushu Electric Power Co., Inc.: PWR) was authorized on September 7, 2005, and the Ikata Unit 3 (Shikoku Electric Power Co., Inc.: PWR) on March 28, 2006, and the Hamaoka Unit 4 (Chubu Electric Power Co., Inc.: BWR) on July 4, 2007.

(6) Measures Taken for Faulty Design of the ABWR Turbine Blades

In June 2006, at Unit 5 of the Hamaoka Nuclear Power Station, Chubu Electric Power Co., Inc. (hereinafter referred to as "Hamaoka Unit 5"). the steam turbine and nuclear reactor were automatically shutdown due to excessive turbine-shaft vibration caused by the breaking off of a blade of the 12th stage of the low pressure turbine(B) NISA performed a visual inspection of the blades etc. removed from the shaft, which belonged to the same stage as the one of the low-pressure turbine (B) where the blades came off, confirmed breakages and cracks at the fork-shape joint section of the blades, and determined that the turbine did not conform to the Technical Requirements for Nuclear Power Generation Equipment. NISA, judging that it was necessary to confirm conformity of the steam turbine of Unit 2 of the Shika Nuclear Power Station, Hokuriku Electric Power Co.,(hereinafter referred to as the "Shika Unit 2", which is of the same design as the one at Hamaoka Unit 5, according to the same Technical Requirements, directed to have the blades checked. As a result, breakages and cracks were confirmed on the blades of the low-pressure turbine (B) also at the Shika Unit 2.

In October of the same year, NISA received a report concerning the causes and countermeasures from Chubu Electric Power Co., Inc. and Hokuriku Electric Power Co., Inc. The report describes that the short-term measures are to remove all of the 12th-stage blades of
the low pressure turbines and to apply pressure plates (distributors) to the stationary blades of the same stage prior to the restart, and the long-term measure is to design and manufacture new blades of the 12th stage, taking into account the fluid-induced vibration force due to random vibration and flashback. In November of the same year, NISA released an investigation report showing that the licensees' measures for prevention of recurrence are adequate.

NISA reported these measures to the Working Group for Accident and Failure Countermeasures of the Subcommittee for Nuclear Emergency Preparedness, under Nuclear and Industrial Safety Subcommittee and the NSC.

Chubu Electric Power Co., Inc. submitted the construction plan of installation of pressure plates to the Hamaoka Unit 5 turbine on November 8, 2006. NISA reviewed the plan. Chubu Electric Power Co., Inc. passed its pre-service inspection and resumed the commercial operation of the Hamaoka Unit 5 on March 13.

NISA, upon receiving the construction plan of installation of distributors to the Shika Unit 2 turbine on November 13, 2006 from Hokuriku Electric Power Co., examined the plan.

(7) Check on the Status of Implementing the Measures against Sodium Leakage of the Monju Power Station

At the fast breeder prototype-reactor "Monju", a sodium leak accident of the secondary cooling system occurred in December 1995, and the reactor has been kept in a low-temperature shutdown state since that time.

The licensee, Japan Nuclear Cycle Development Institute (in October 2005, the Institute was integrated with the Japan Atomic Energy Research Institute, and has become an incorporated administrative agency, Japan Atomic Energy Agency), in July 2007, completed construction work for the measures to cope with sodium leakage that started in September 2005. Monju is now conducting verification tests of the completion of the work. NISA, as the prerequisite to the restart of the Monju, is conducting the following:

1) Integrity check on equipment, system and fuel that have not been used for a long period of time, with pre-service inspection and on-site inspection

2) Check on the quality assurance relating to technical capabilities, the time required to extract the secondary-system sodium, the plant maintenance plan, with pre-service inspection and on-site inspection.

3) Safety examination for the application of change in fuel assemblies for the first core loading.

Concerning the safety examination for the application of change in fuel assemblies for the first core loading, in October 2006, Japan Atomic Energy Agency applied the usage of fuel assemblies prepared for reload of the core as the first core loading to be used at the restart of
Monju. NISA asked for consultation to the NSC in July 2007.

Various activities for ensuring the safety of Monju have been confirmed openly in the "Study Group for Confirmation of the Monju Safety", which was established under the Nuclear and Industrial Safety Subcommittee in November 2005. As of June 2007, the Study Group was held 9 times.

The NSC conducted the audit of NISA’s activities based on the reports about 1) The Results of Confirmation about the Monju Integrated Safety Check and 2) The Results of Deliberation about the Important Items after the Approval of Amendment of Monju Establishing License, and the NSC appraised, in its decision in June 2007, the NISA’s activities concerning confirmation of Quality Management System as appropriate.

(8) Check on Seismic Safety of the Onagawa Nuclear Power Station

When the earthquake occurred in Miyagiken-okii in August 2005, the Onagawa Nuclear Power Station of Tohoku Electric Power Co., Inc. experienced earthquake ground motion exceeding the design basis earthquake ground motion. NISA directed Tohoku Electric Power Co., Inc. to analyze the factors that caused earthquake ground motion which exceeded the design basis earthquake ground motion, to check the seismic safety in reference to the important-to-safety equipments of the power station. In accordance with the direction, Tohoku Electric Power Co., Inc. first reported the results of the check on seismic safety for Units 2 and 3 of the power station to NISA. NISA, based on the evaluation of the report, notified the licensee that the evaluation methods of seismic safety and study results of the seismic safety of the licensee are adequate. Since Unit 1 of the Onagawa Nuclear Power Station has been in operation for 22 years after commissioning, NISA directed the licensee to assess also the effect of aging on the seismic safety. In September 2006, NISA notified the licensee that the evaluation methods and results of the check on the seismic safety submitted by the licensee are adequate. For additional information, refer to the report of Article 14 (Section 14.5).

Units 1, 2 and 3 of the Onagawa Nuclear Power Station were automatically shutdown when the earthquake occurred and had undergone the Periodic Inspection after that, they resumed their operation after receiving notifications of confirmation of the equipment seismic safety and completing the Periodic Inspections one by one.

(9) Measures Taken for the Partial Omission of Periodic Inspections Conducted by the Incorporated Administrative Agency, Japan Nuclear Energy Safety Organization (JNES)

On February 22, 2007, NISA received a report from JNES, which indicated that an incomplete inspection (failure to perform a part of functional test) was discovered at the 21st Periodic Inspection of the Tokai No.2 Power Station, the Japan Atomic Power Company, conducted by JNES in 2005. On February 23, 2007, NISA ordered to report the result of the check if there are any other incomplete inspections to JNES in accordance with the Electricity Utilities Industry Law. On March 9, 2007, JNES reported to NISA that three defects in the record check were discovered at the Periodic Inspections of other power plants in addition to the above-mentioned one. The report describes that the root cause of the defects in record check
(failure to check records, failure to prepare inspection records, etc.) is an inadequate mechanism to not file or check records due to human error, and the measures to prevent recurrence are process management by making an appropriate management table and improvements in the mechanism to check by the administration department. The Director General of NISA expressed that “it is regrettable that defects were found in the Periodic Inspections conducted by JNES”, and he issued a severe warning in writing and directed the President of JNES to take measures of thorough recurrence-prevention.

(10) Comprehensive Check of Electric Power Facilities

1) Background and Circumstances of the Comprehensive Check of Electric Power Facilities

On November 21, 2006, NISA received a report from the Chugoku Electric Power Co., Inc., which describes that the company falsified data regarding a dam for a hydroelectric power plant in the past. Receiving information that other licensees have also conducted construction work on hydraulic power production plants without obtaining authorization in accordance with the River Law, NISA directed all licensees to conduct investigations into hydraulic power production plants. At the same time, at nuclear power plants, cases such as inappropriate corrections for the measured temperatures of seawater for cooling were also revealed.

Receiving a series of such reports, NISA, under direction of the Minister of METI, directed licensees on November 30, 2006 to check whether there exists any similar data falsification (hereinafter referred to as the "Comprehensive Check") concerning the facilities for hydraulic-power, thermal-power and nuclear-power generation and to make a report on the results of the check by March 31, 2007.

On March 30, 2007, the licensees reported 316 cases in total to NISA as the results of the Comprehensive Check regarding data falsification etc., and on April 6 of the same year, measures to prevent recurrence were reported.

On April 20, 2007, the Minister of METI issued a document reconfirming the purposes and objectives of the Comprehensive Check to the presidents of all electric power companies. The document explains that the main purport of the Comprehensive Check is "to disclose facts without hiding them", specifically, (1) to cut off the vicious circle of continuing to falsify records on the premise of past falsifications, (2) to establish a mechanism not to allow a falsification, (3) to share information on accidents and troubles, and utilize them for prevention of recurrence, and (4) to improve the culture and climate of electric power companies by steadily promoting such activities.

The 316 cases were classified into the following four groups according to the contents;

Group 1: Cases that conflict with legislations and regulations, and have effect on the safety

Group 2: Cases that are confirmed not to compromise safety, but conflict with
legislations and regulations and are issues in terms of compliance

Group 3: Cases that are not necessarily related to safety requirements, but conflict with legislations and regulations and are issues in terms of compliance

Group 4: Errors in writing etc.

The Minister of METI decided to make administrative dispositions according to the contents and group of the reported cases, and in accordance with the provisions of the Administrative Procedure Law, issued a document listing notices of the dispositions, saying that an appeal against the notice of the dispositions is acceptable to the licensees. Also, the Minister issued a document instructing to submit a specific program and schedule for measures to prevent recurrence. In addition, the Minister issued a document to the manufacturers concerned, requesting them to make an action plan to improve a level of nuclear safety, including a mechanism of sharing information and to promote sharing information concerning safety technologies when responding to the requirement from electric power companies for maintenance management and procurement.

The above-mentioned administrative dispositions were implemented, since there was no overture of an appeal from the licensees. METI, based on the Comprehensive Check results on the power generation facilities, also established an action plan that specifies responses to be taken by METI itself.

2) Instructions to Improve Safety and Safe Operation of Nuclear Power Generation Facilities

The Comprehensive Check results of nuclear power generation facilities showed that there had been no falsifications since October 2003 when the inspection system was revised. Although they were the cases within the period before the revision of the inspection system, there were a total of 98 cases, including 11 cases conflicting with the Reactor Regulation Law and the Electricity Utilities Industry Law and impairing the safety that the laws intend to ensure (Group 1) (refer to Table 6-2). Major actions taken by METI after receiving the results include; (1) issuing an order to amend the Operational Safety Program of the nuclear power stations of TEPCO, Hokuriku Electric Power Co., the Chugoku Electric Power Co., Inc., and the Japan Atomic Power Co., (2) earlier-than-scheduled implementation of, or extension of period for the Periodic Inspections of these electric power companies' nuclear power stations, and implementation of special inspections of the Operational Safety Inspections and Periodic Inspections including the appointment of NISA Special Nuclear installation Management Supervisors, etc., (3) amendment of a Ministerial Order for making it mandatory to report the accidental withdrawal of control rods, etc., and the promotion of international sharing of information concerning accidents and failures.

On May 21, 2007, all licensees concerned submitted the action plans for prevention of recurrence to METI. The major specific contents include; involvement of executives to the program, thorough implementation of education on operational safety, retention of records by alarm typewriters, supporting free access of NISA Nuclear Safety Inspectors to nuclear installations, independency of chief reactor engineer, promotion of information sharing with
NUCIA etc., report of a deviation from the limiting conditions for operation, interdepartmental information sharing, information sharing among electric power companies. NISA judged that these action plans are generally adequate as they are based on the instructions issued by METI and the time schedule and methods to implement these actions are concretely provided, and decided to check the implementation status through the Operational Safety Inspection etc. NISA also decided to make necessary amendments etc. of legislations and regulations corresponding to implementation of the action plan. These responses were reported to the NSC.

Receiving the report from NISA about the falsification and concealment concerning nuclear facilities, the NSC has investigated and has tried to understand the whole story. Responding to the actions taken by METI, the NSC determined “Actions to take concerning the malicious conducts of unreported alteration and concealment at nuclear facilities” on April 23, 2007. As a part of these actions, the NSC ; on May 15, 2007, invited the Chief Reactor Engineers from each nuclear power plants, interviewed and exchanged the opinions, ; on May 17 and 31, 2007, heard the opinions of Executive of Hokuriku Electric Power Co. Ltd, and ;on May 28 and June 4, 2007, heard from Japan BWR Owners Group and Japan PWR Owners Group respectively, about their activities for information sharing and for analyzing accident and failure.

6.3 Evaluation and Verification of Safety, and Position as to Continued Operation

NISA had implemented the necessary safety assessment and verification for existing nuclear installations at planning, licensing, construction and operation stages. They are explained in the reports of Article 7 to Article 19.

Through those assessments and verification, principles of this convention have been applied to ensure the safety of existing nuclear installations for every stage from licensing to operation.

As shown in Section 6.2, for events that occurred during the period after the previous reporting, NISA had judged appropriately whether any issue on safety existed or not, instructed licensees to take measures for ensuring safety, as necessary, and confirmed that the measures were appropriately taken. Therefore, it is appropriate to continue operation of operating nuclear installations.

For the Monju, which is a nuclear installation under construction that has attained criticality, implementation of safety measures against sodium leakage and the passing the pre-operational inspection are requirements for its operation.
Table 6-1 Accidents and Failures at Nuclear Power Stations Reported by Licensees during the Reporting Period

<table>
<thead>
<tr>
<th>Name of power plant</th>
<th>Title</th>
<th>Event date</th>
<th>INES level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takahama, Unit 4</td>
<td>Significant indication by the eddy current examination of steam generator tubes</td>
<td>September 6, 2004</td>
<td>0–</td>
</tr>
<tr>
<td>Sendai, Unit 1</td>
<td>Significant indication by the eddy current examination of steam generator tubes</td>
<td>September 10, 2004</td>
<td>0–</td>
</tr>
<tr>
<td>Tomari, Unit 1</td>
<td>Significant indication by the eddy current examination of steam generator tubes</td>
<td>September 21, 2004</td>
<td>0–</td>
</tr>
<tr>
<td>Fukushima Daiichi, Unit 2</td>
<td>Automatic trip of one reactor-coolant recirculation pump</td>
<td>September 29, 2004</td>
<td>0–</td>
</tr>
<tr>
<td>Mihama, Unit 1</td>
<td>Insufficient wall thickness of the turbine-driven auxiliary feedwater piping</td>
<td>October 25, 2004</td>
<td>0–</td>
</tr>
<tr>
<td>Sendai, Unit 2</td>
<td>Significant indication by the eddy current examination of steam generator tubes</td>
<td>December 15, 2004</td>
<td>0–</td>
</tr>
<tr>
<td>Hamaoka, Units 1 &amp; 2</td>
<td>Cracks of Units 1 and 2 common stack duct joint</td>
<td>December 21, 2004</td>
<td>0–</td>
</tr>
<tr>
<td>Ikata, Unit 1</td>
<td>Cracks of ventilation stack of the reactor auxiliary building</td>
<td>December 23, 2004</td>
<td>0–</td>
</tr>
<tr>
<td>Tsuruga, Unit 2</td>
<td>Significant indication by the eddy current examination of steam generator tubes</td>
<td>January 18, 2005</td>
<td>0–</td>
</tr>
<tr>
<td>Kashiwazaki Kariwa, Unit 1</td>
<td>Steam leak from the small-bore drain pipe in the turbine building</td>
<td>February 4, 2005</td>
<td>0–</td>
</tr>
<tr>
<td>Onagawa, Unit 1</td>
<td>Nitrogen leak from the reactor containment</td>
<td>February 25, 2005</td>
<td>0–</td>
</tr>
<tr>
<td>Mihama, Unit 1</td>
<td>Failure of B make-up-pump manifold cover bolts</td>
<td>March 19, 2005</td>
<td>Out of scale event</td>
</tr>
<tr>
<td>Mihama, Unit 1</td>
<td>Cracks of the lower part of auxiliary building ventilation stack, and the faulty connection of a drain pipe</td>
<td>April 28, 2005</td>
<td>Out of scale event</td>
</tr>
<tr>
<td>Ikata, Unit 3</td>
<td>Failure of the chiller for the central control room air conditioner</td>
<td>May 12, 2005</td>
<td>0–</td>
</tr>
<tr>
<td>Kashiwazaki Kariwa, Unit 5</td>
<td>Automatic reactor shutdown following the turbine trip due to low condenser vacuum</td>
<td>July 3, 2005</td>
<td>0+</td>
</tr>
<tr>
<td>Shimane, Unit 1</td>
<td>Indication trouble for closed position of a drywell vacuum breaker valve</td>
<td>July 8, 2005</td>
<td>0–</td>
</tr>
<tr>
<td>Tokai, No.2</td>
<td>Valve stem failure of motor-driven reactor feedwater pump discharge valve</td>
<td>August 10, 2005</td>
<td>0–</td>
</tr>
<tr>
<td>Fukushima Daiichi, Unit 5</td>
<td>Valve stem failure of the test bypass valve of the core spray system</td>
<td>August 22, 2005</td>
<td>0–</td>
</tr>
<tr>
<td>Mihama, Unit 1</td>
<td>Make-up water leakage from the seal of primary coolant pump No. 3</td>
<td>September 29, 2005</td>
<td>0–</td>
</tr>
<tr>
<td>Fukushima Daiichi, Unit 2</td>
<td>Automatic trip of one reactor-coolant recirculation pump</td>
<td>October 9, 2005</td>
<td>0–</td>
</tr>
<tr>
<td>Fukushima Daini, Unit 2</td>
<td>Damage of a seawater strainer of the cooling system for residual heat removal equipment</td>
<td>November 2, 2005</td>
<td>0–</td>
</tr>
<tr>
<td>Tomari, Unit 1</td>
<td>Cracks near the weld of stiffener for emergency ventilation stack</td>
<td>January 6, 2006</td>
<td>0–</td>
</tr>
<tr>
<td>Sendai, Unit 1</td>
<td>Significant indication by the eddy current examination of steam generator tubes</td>
<td>January 13, 2006</td>
<td>0–</td>
</tr>
<tr>
<td>Name of power plant</td>
<td>Title</td>
<td>Event date</td>
<td>INES level</td>
</tr>
<tr>
<td>---------------------</td>
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</tr>
<tr>
<td>Shika, Unit 2</td>
<td>Manual shutdown of the nuclear reactor due to malfunction of a steam supply isolation valve of the reactor core isolation cooling system</td>
<td>January 27, 2006</td>
<td>0−</td>
</tr>
<tr>
<td>Fukushima Daiichi, Unit 6</td>
<td>Cracks etc. of hafnium-plate-type control rods</td>
<td>February 1, 2006</td>
<td>1</td>
</tr>
<tr>
<td>Fukushima Daiichi, Unit 3</td>
<td>Cracks etc. of hafnium-plate-type control rods</td>
<td>March 3, 2006</td>
<td>1</td>
</tr>
<tr>
<td>Fukushima Daiichi, Unit 2</td>
<td>Automatic trip of one reactor-coolant recirculation pump</td>
<td>March 14, 2006</td>
<td>0</td>
</tr>
<tr>
<td>Ikata, Unit 1</td>
<td>Cracks of the weld of steam distributor in the moisture separator and reheater</td>
<td>June 5, 2006</td>
<td>Out of scale event</td>
</tr>
<tr>
<td>Fukushima Daini, Unit 1</td>
<td>Cracks of a valve stem of a residual heat removal system flow control valve</td>
<td>June 7, 2006</td>
<td>0</td>
</tr>
<tr>
<td>Hamaoka, Unit 5</td>
<td>Automatic shutdown of the nuclear reactor following steam turbine trip</td>
<td>June 15, 2006</td>
<td>0+</td>
</tr>
<tr>
<td>Onagawa, Unit 2</td>
<td>Observation of water puddle containing radioactive materials in the reactor-building torus room</td>
<td>August 3, 2006</td>
<td>0−</td>
</tr>
<tr>
<td>Hamaoka, Unit 3</td>
<td>Cracks etc. of hafnium-plate-type control rods</td>
<td>August 7, 2006</td>
<td>1</td>
</tr>
<tr>
<td>Fukushima Daini</td>
<td>Tritium release to the outside of control zone</td>
<td>August 11, 2006</td>
<td>0−</td>
</tr>
<tr>
<td>Takahama, Unit 3</td>
<td>Automatic shutdown of the nuclear reactor due to low steam-generator level during power down</td>
<td>August 18, 2006</td>
<td>0+</td>
</tr>
<tr>
<td>Tsuruga, Unit 2</td>
<td>Cooling water leak from heat transfer tube of the reactor building closed cooling water system</td>
<td>October 4, 2006</td>
<td>0−</td>
</tr>
<tr>
<td>Shimane, Unit 1</td>
<td>Corrosion of condensate storage tank</td>
<td>October 13, 2006</td>
<td>0−</td>
</tr>
<tr>
<td>Shimane, Unit 1</td>
<td>Wall thinning of piping at condensate filter outlet header</td>
<td>November 9, 2006</td>
<td>0−</td>
</tr>
<tr>
<td>Fukushima Daiichi, Unit 2</td>
<td>Manual reactor shutdown following earth fault of circuit for the automatic depressurization system</td>
<td>January 17, 2007</td>
<td>0−</td>
</tr>
<tr>
<td>Genkai, Unit 2</td>
<td>Cracks of extraction piping of the surplus extraction water system</td>
<td>January 24, 2007</td>
<td>0−</td>
</tr>
<tr>
<td>Fukushima Daiichi, Unit 4</td>
<td>Reactor power change due to a misoperation</td>
<td>February 11, 2007</td>
<td>0+ (tentative)</td>
</tr>
<tr>
<td>Fukushima Daini, Unit 4</td>
<td>Automatic shutdown of the nuclear reactor due to an alarm of &quot;main steam pipe radioactivity high-high trip&quot;</td>
<td>February 18, 2007</td>
<td>0− (tentative)</td>
</tr>
<tr>
<td>Fukushima Daiichi, Unit 5</td>
<td>Manual reactor shut-down due to malfunction of a valve of the core spray system</td>
<td>February 20, 2007</td>
<td>0+ (tentative)</td>
</tr>
<tr>
<td>Sendai, Unit 1</td>
<td>Significant indication by the eddy current examination of steam generator tubes</td>
<td>May 10, 2007</td>
<td>0− (tentative)</td>
</tr>
<tr>
<td>Electric power company</td>
<td>Plant name</td>
<td>Time period</td>
<td>Summary</td>
</tr>
<tr>
<td>------------------------</td>
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<td>---------</td>
</tr>
<tr>
<td>Hokuriku Electric Power Co.</td>
<td>Unit 1 of the Shika Nuclear Power Station</td>
<td>June 1999</td>
<td>• Criticality accident occurred during reactor shutdown (during Periodic Inspection) During the Periodic Inspection, a criticality accident occurred due to the withdrawal of three control rods caused by inadvertent isolation work of hydraulic control units. The logbook etc. was falsified in this case and also a report to the national government required by legislations and regulations was not made. Furthermore, no investigation into the cause was conducted and no measures to prevent recurrence taken.</td>
</tr>
<tr>
<td></td>
<td>Unit 3 of the Fukushima Daiichi Nuclear Power Station</td>
<td>November 1978</td>
<td>• Criticality of nuclear reactor due to control-rods withdrawal and falsification of logbook, etc. During Periodic Inspection, five control rods were withdrawn due to inadvertent isolation works of hydraulic control units, which resulted in the criticality of the reactor. Since the operation shift at that time did not recognize the occurrence of criticality and did not take any special measures, the criticality lasted over 7 and a half hours. In addition, the logbook was falsified to hide the fact.</td>
</tr>
<tr>
<td>Tokyo Electric Power Co., Inc.</td>
<td>Unit 4 of the Fukushima Daini Nuclear Power Station</td>
<td>From October 1988 to January 1990</td>
<td>• Unlawful actions for construction plan and pre-service inspection of a control rod drive mechanism, At scram tests of the control rod drive mechanisms (CRD), trouble occurred at one CRD. Replacement of the CRD concerned was performed without submitting the construction plan for it. After that, unlawful action such as undergoing the pre-service inspection of the CRD while using a fake unit was also committed.</td>
</tr>
<tr>
<td></td>
<td>Unit 1 of the Kashiwazaki Kariwa Nuclear Power Station</td>
<td>May 1992</td>
<td>• Falsified indication for operation of a residual-heat-removal cooling intermediate pump (A) Although the motor of the residual-heat-removal cooling intermediate (RHIW) pump (A) was out of order, emergency diesel generators underwent inspection with the indication lamp tampered in the central control room so as to make it look as if the pump started. Then, the nuclear reactor was started without checking the integrity of other systems, which is required by the Operational Safety Program.</td>
</tr>
<tr>
<td>The Chugoku Electric Power Co., Inc.</td>
<td>Unit 2 of the Shimane Nuclear Power Station</td>
<td>May 1998</td>
<td>• Negligence of checking the operability of other trains in repairing diesel engine cooling water leakage Although one train of the emergency diesel generators was inoperable with the reactor at rated power, the record of having conducted tests for other trains, which are required by the Operational Safety Program to continue operation, could not be confirmed.</td>
</tr>
<tr>
<td>Electric power company</td>
<td>Plant name</td>
<td>Time period</td>
<td>Summary</td>
</tr>
<tr>
<td>------------------------</td>
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</tr>
<tr>
<td></td>
<td>Unit 1 of the Shimane Nuclear Power Station</td>
<td>June 2001</td>
<td>• Negligence of checking the operability of other trains in repairing high-pressure-core-injection-system main stop valve (HPCI MSV) as it failed to open Since the main stop valve failed to open with the reactor at rated power, the repair was performed, but the record of having checked the operability of the alternative emergency core cooling systems, which is required by the Operational Safety Program to continue operation, could not be confirmed.</td>
</tr>
<tr>
<td></td>
<td>Unit 2 of the Tsuruga Power Station</td>
<td>January 1994</td>
<td>• Negligence of checking the operability of other systems in replacing a part (gasket) for leak-tightness of emergency diesel generator Although a water leakage occurred at the cooling water system of one emergency diesel generator, reactor operation continued without checking the integrity of other systems.</td>
</tr>
<tr>
<td></td>
<td>Unit 1 of the Tsuruga Power Station</td>
<td>From September 1995 to March 2000</td>
<td>• Hiding the corrosion event on the outside surface of condensate storage tank Although the plate thickness of the tank lower section became less than the required minimum thickness specified in the application of construction permit due to corrosion, the tank was used with its water level lowered without checking the required strength.</td>
</tr>
<tr>
<td></td>
<td>Unit 2 of the Tsuruga Power Station</td>
<td>From April to December 1996</td>
<td>• Hiding the occurrence of a very small leak of the reactor coolant When a leak was found in the piping in the containment, the operation should have been discontinued for repair, but the fact was hidden and the operation was continued without repair for about 8 months.</td>
</tr>
<tr>
<td></td>
<td>Unit 2 of the Tsuruga Power Station</td>
<td>July 1997</td>
<td>• Deceptive action to an equalizing valve during an inspection of containment leakage rate An official inspection of containment leakage rate was conducted with a block plate installed at the outlet of an inboard equalizing valve with a leak identified, of the regular airlock, without following the appropriate in-house procedures. Then, the nuclear reactor was started up with the equalizing valve replaced, but the local leak rate test was not carried out prior to the start-up.</td>
</tr>
<tr>
<td></td>
<td>Tokai No.2 Power Station</td>
<td>2001 or before</td>
<td>• Falsification of flow-rate data during a functional test of the reactor building gas processing system Since the airflow did not satisfy a specified flow rate during a functional test of the standby gas treatment system, the data was falsified with instrument adjustments so as to satisfy the specified flow rate.</td>
</tr>
</tbody>
</table>
A nuclear installation in preparation for construction means one authorized by the Electric Power Development Working Group (the Electric Power Development Coordination Council up to January 2001) of the Advisory Committee for Natural Resources and Energy, but has not received an approval for its first construction plan.
The NSC 2007-D8 (Decided on 23 April 2007)

Actions to take, concerning the malicious conducts of unreported alteration and concealment at nuclear facilities (Summary)

The NSC received on 20 April 2007 a report from NISA on the “Assessment and follow-up actions concerning comprehensive checks of power generation facilities (Comprehensive Inspection Report)” and another report on the “Investigation of the criticality accident in 1999 Unit 1, Shika Nuclear Power Station, Hokuriku Electric Power Company, Inc. and other unforeseen cases of control rod dislodgement during reactor outages (Criticality Accident Report).”

Repeated malicious conducts of unreported alteration and concealment jeopardize the base of ensuring nuclear safety. It is really shameful that some serious cases were among them.

Currently nuclear licensees have been in the process of implementing recurrence prevention measures under the regulatory frames strengthened in 2002 and 2003. The actions were being taken based upon the lessons uncovered of similar data alterations in the past. Most of malicious conducts recently uncovered were before these recurrence prevention measures came into effect. Nevertheless, the recently uncovered cases again hampered the public trust in nuclear energy.

For recovering public trust, the NSC considers it really important to put into effect soonest the follow-up actions proposed by NISA. Following are the immediate actions by the NSC.

1. Criticality accidents and control rod dislodgement

The criticality accident on Unit 1, Shika Nuclear Power Station, Hokuriku Electric Power Company, Inc. is really a matter of serious concern in the context that an unforeseen criticality, which is an emergency (at a nuclear power plant), is secretly covered. The NSC shall examine closely the unforeseen cases of control rod dislodgement, in view of their risks to fundamental nuclear safety.

It is to the NSC awareness, meanwhile that, among the cases of control rod dislodgement, which came into light starting with the criticality accident of Hokuriku Electric Power Company, there are some cases irrelevant to data alterations.

(1) The ensuring of safety during reactor outages

The Criticality Accident Report (NISA) states, “Important is to examine how to ensure reactor safety, as part of operation management during outages, including hardware modifications if necessary, because safety functions of the facility could be temporarily lifted during periodic inspection outages for the purpose of inspections or tests.”
It is the NSC position that the principle of defense-in-depth should be maintained for safety measures and their certain implementation even during the outages.

Therefore, the NSC will conduct necessary examinations, being informed from NISA of its investigation and examination results of safety measures during outages such as operation management including hardware modifications as needed, based on the lessons from the criticality accident at Shika or from abroad.

(2) Criticality accident on Unit 1, Shika Nuclear Power Station, Hokuriku Electric Power Company, Inc.

The Criticality Accident Report (NISA) also states that “the analysis (by the Hokuriku Electric Power Company) meets with margin the safety criteria of the abnormal transients assumed in the (earlier) safety examination process, and, hence, the fuel integrity was apparently not jeopardized.”

Upon NISA instructions, JNES is to perform an “independent (cross) check” of this analysis. The NSC requests NISA to report to the NSC on its evaluation of the case based on the JNES analyses.

Besides the regulatory requirements, the NSC plans to interview, at the earliest convenience, the top management of the operator concerning its determined measures to let such critical occurrence never concealed again.

2. Analyses of, and feedback from, the information on accidents and troubles
(1) Global sharing of the information on accidents and troubles, and its utilization

The Criticality Accident Report (NISA) also clarifies that: Six unforeseen criticalities have been reported at commercial BWR plants, three out of which occurred during the outages; all these three cases occurred when control rods were maneuvered for insertion or withdrawal, the situation being different from the recent case of Hokuriku Electric Power Company; and, for this reason, no significant information could have been withdrawn from these cases for preventing the recent case of Hokuriku Electric Power Company.

Besides the cases mentioned in the Criticality Accident Report (NISA), the criticality accident in 1987 during the outage at the Oskarshamn Nuclear Power Station, Sweden, prompted NRC to draw attention of the US BWR owners.

The NSC must admit that Japan is still insufficient to share the global information on nuclear accidents and troubles, considering not only the criticality cases but also other cases, such as the secondary circuit pipe rupture at Unit 2, Surry Nuclear Power Station, U.S. (1986), or the strainer blockage at Unit 2, Barseback Nuclear Power Station, Sweden (1992).

Needless to say, it is quite important to extract lessons for enhancing nuclear safety of our national nuclear facilities from the information on nuclear accidents and troubles in other
countries. It is equally important to carefully examine our cases, in disseminating our national experience to other countries, in terms of their impacts to our national nuclear facilities as well as their user-friendliness to international recipients.

Therefore, NISA should strengthen its activities on the collection/dissemination and the analysis/utilization of international information relevant to nuclear accidents and troubles, by the use of multi-national (IAEA, for instance) or bilateral cooperation frameworks.

The NSC also examines the measures to make use of internationally shared information, such as the IAEA databases, for preventing accident recurrences in our country.

(2) Information sharing among utilities and reactor manufacturers, and its utilization

Important in the utilization of the information relevant to accidents/troubles is for electric utilities and reactor manufacturers to analyze the causes closely and share the recurrence prevention measures based thereupon. As pointed out in the Criticality Accident Report (NISA)\(^1\), the electric utilities and reactor manufacturers should, through the association such as the Japan BWR Owners Group and the Japan PWR Owners Group, acknowledge the importance of sharing the technological information and its use for accident recurrence prevention.

With the intention of promoting such activities, the NSC plans to interview, at the appropriate timing, the Japan BWR Owners Group and the Japan PWR Owners Group concerning their activities for information sharing.

(3) Knowledge base building of reactor operating information by nuclear operators

The information on operation management should be appropriately recorded and accumulated for analysis and use for enhancing nuclear safety. However, the Comprehensive Inspections Report (NISA) has revealed a number of cases with defects in this regard.

The NSC takes a position that a station-level knowledge base on the operation management information should be the generic base condition for recurrence prevention. To this end, an electronic system at a station-level is an effective means for sharing the operation management information and for its automatic recording and preservation. The NSC requests nuclear operators to proactively tackle this issue, although it is not a regulatory requirement. The system would also contribute to the prevention of malicious conducts such as data alteration.

3. Advancement of revising the legally bound inspection regime

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\(^1\) The Japan BWR Owners Group is tackling the issue of information sharing, with participation of the electric utilities and the reactor manufacturers. Such activities should be vigorously and effectively exercised.
NISA has been examining, at its “Committee on the Inspection System,” a more scientific and rationalized inspection regime with due consideration to plant specific maintenance programs.

The NSC takes a position that the lessons from the Comprehensive Inspections Report (NISA) should be aggressively reflected in this revision process and, therefore, the Committee’s examination be advanced so that the operators’ safety measures be further promoted. The NSC expects to be informed, at the appropriate timing, of the concrete approach of NISA for advancing the revision process.

4. The NSC plans for motivating field-oriented approaches by means of site interviews of Reactor Chief Engineers

The reactor chief engineers are, as prescribed in the Reactors Regulation Law, responsible for supervising the plant safety measures. They are due to play crucial roles in ensuring reactor safety, with full use of their professionally technological knowledge and experience.

The NSC plans to promote placing higher importance to the plant site, or the very front line of ensuring safety. To this end, the NSC plans to share the problem awareness with reactor chief engineers through direct interviews at the earliest convenience and also encourage mutual information exchange between them.

5. NISA Plan of reviewing the revision of operator’s safety rules and of special safety inspections

NISA plans to execute special programs for nine units at seven nuclear power stations, which have been ranked as “I” in its Comprehensive Inspections Report. The NISA special programs: require the revision of safety rules to prescribe the reporting system, upon major accidents, to the top management for recurrence prevention; plan special inspections at the earliest periodic inspection; execute special supervision by special nuclear facility superintendents; and implement special safety inspections.

The NSC is to receive reports from NISA as appropriate and watch the development.

6. Subsequent Regulation Reviews of NISA’s follow-up actions

The NSC plans Subsequent Regulation Reviews for the regulation-related items from among NISA’s follow-up actions, in order to enhance nuclear safety.
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B. Legislation and Regulation
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Article 7 Legislative and Regulatory Framework

1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations.

2. The legislative and regulatory framework shall provide for:
   (i) the establishment of applicable national safety requirements and regulations;
   (ii) a system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a licence;
   (iii) a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licenses;
   (iv) the enforcement of applicable regulations and of the terms of licences, including suspension, modification or revocation.

The Atomic Energy Basic Law has been established as the basic law governing the utilization of nuclear energy, and the Law on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (hereinafter referred to as the “Reactor Regulation Law”), the Electricity Utilities Industry Law etc. have been established as the laws to govern the safety of nuclear installations, which are subjects to the convention.

As a progress after the previous report, the technical standard in accordance with the Electricity Utilities Industry Law has been revised to define performance requirements, and the detailed specifications conforming to the performance requirements were defined by standards of the private sectors. And the Regulatory Guide for Reviewing Seismic Design of Nuclear Power Reactor Facilities etc. (hereinafter referred to as the “Regulatory Guide for Reviewing Seismic Design”) has been revised, incorporating the latest knowledge into the technical requirements. The issues which are now under review and will be reflected to future revision or establishment of legislations and regulations are the new inspection system currently being reviewed by “The Taskforce on Inspection System” (see Article 19) and the use of risk information in legislations (see Article 14).

7.1 System of Legislations Governing the Nuclear installations

(1) Legislations concerning Utilization of Nuclear Energy in General

The overall system of legislations and regulations for utilization of nuclear energy is based on the Atomic Energy Basic Law. The objectives of the Atomic Energy Basic Law are quoted as "to secure future energy resources, achieve progress in science and technology, and promote industry, by encouraging research, development, and utilization of nuclear energy, and thereby contribute to improvement of the welfare of human society and the people's living standard." The basic policy is prescribed as follows: "the research, development and utilization of nuclear energy shall be limited to peaceful purposes, on the basis of the highest priority of ensuring safety, and performed on a self-controlled basis under democratic administration, and the results obtained shall be made public and actively contribute to international cooperation."
In order to achieve these objectives and the basic policy, the law provides establishment of a set of laws to govern following areas:

- Regulations governing nuclear fuel materials and nuclear source materials.
- Regulations for construction, etc. of nuclear reactors.
- Prevention of radiation hazards.
- Compensation for a nuclear damage

The law also provides that those who will utilize nuclear energy shall manage their facilities with the first priority on safety under the supervision of the regulatory body in accordance with these laws.

The basis to establish organizations related to regulation and the missions of the organizations are provided in the laws, such as the "Law for Establishment of the Atomic Energy Commission and the Nuclear Safety Commission", "Law for Establishment of the Ministry of Economy, Trade and Industry", "Law for the Japan Nuclear Energy Safety Organization, Incorporated Administrative Agency."

(2) System of Legislations and Regulations Governing the Safety of Nuclear Installations, Subjects of the Convention on Nuclear Safety

Major legislations and regulations for safety regulation of nuclear installations are shown in Figure 7-1. As shown in the figure, 1) the Law on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors, 2) the Electricity Utilities Industry Law, 3) the Basic Law for Emergency Preparedness and the Special Law of Emergency Preparedness for Nuclear Disaster, 4) The Laws for Radiation Protection., 5) the Environment Impact Assessment Law, and 6) the Law on Compensation for Nuclear Damages have been enacted as major legislations and regulations.

These laws provide requirements for approval, inspection and notification of licensing, construction, operation and decommissioning of establishment of nuclear installations. They are enacted after deliberations at the Congress, which means the revision also requires the resolution at the Congress.

The nuclear installations in the scope of this Convention are any land-based civil nuclear power plants. They are using nuclear fuels and are regulated by both laws of safety regulations for reactors using nuclear fuel (Reactor Regulation Law) and safety regulations for commercial electric power generation (Electricity Utilities Industry Law). However, the regulations in accordance with the both laws are ruled not to overlap for the same matter.

The authorization is entrusted to regulatory body by in a law ,and the ordinances, in the
hierarchy under the law, describing the procedures for approval, inspection and notification, are enacted or revise, by the competent authorities, after obtaining the decision by the Cabinet. In the hierarchy under the ordinance, there are the rules which the competent authorities can establish, in accordance with the authorization by the law and the ordinance, to define the details of application, the basis for approval, the technical requirements, the control items for radiation protection, the licensee’s measures for safe operation, etc for approval, inspection and notification of various matters. And the competent authorities of the legislations and regulations can establish the technical standards (notice) and the guidelines of detailed technical requirements in accordance with these legislations and regulations.

(3) Outlines of Major Laws and Regulations related to the Safety Regulation for Nuclear Installations

Outlines of each major law and regulation are described as follows:

1) Law on the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors (Reactor Regulation Law)

The Reactor Regulation Law, in order “to ensure that the utilization of nuclear source material, nuclear fuel material, and reactors are limited to peaceful purposes, and carried out in a planned manner, and to ensure safety of the public by preventing the hazards due to these utilization and providing physical protection of nuclear fuel material, in accordance with the spirit of the Atomic Energy Basic Law”, provides prescriptions on establishment and operation etc. of reactors.

And the following matters are established for reactor facilities

- Regulations on the basic design and policies of reactor facilities for establishment of reactor facilities,
- Regulations on the detailed design for construction of reactor facilities (approval of design and construction methods),
- Inspections at the time of construction of reactor facilities (approval of the welding method, welding inspection and pre-service inspection),
- Regulations for operation of reactor facilities (approval of the Operational Safety Program and the Operational Safety Inspection) (inspection of the observance status of the Operational Safety Program), notification of operation plan),
- Inspection for operation of reactor facilities (Periodic Inspections of reactor facilities),
- Safe operation of reactor facilities and measures to be taken for protection of specific nuclear fuel materials,
- Regulations on transfer, succession or merger of reactor facilities, and
Dismantling of reactor facilities.

The allegation system was established so that personnel of licensees can allege violation of Reactor Regulation Law to the Minister of Economy, Trade and Industry or the Nuclear Safety Commission (the NSC), without unfavorable treatment. The system provides the rule to handle the allegation, such as for protection of personal data of allegers and for appropriate implementation of the procedure for investigation and disclosure of an alleged case. By the end of March, 2007, Ministry of Economy, Trade and Industry (METI) investigated 33 alleged cases, and the NSC investigated 6 alleged cases. Licensee's violation of legislations and regulations can be discovered early by the allegation system and nuclear disaster is expected to be prevented.

The Minister of METI is required to report quarterly the status of regulatory activities for approval of the Operational Safety Program and their change to the NSC.

For commercial power reactors, the provisions of Electricity Utilities Industry Law are applied for regulations on the detailed design for construction of reactor facilities (approval of design and construction methods), inspections at the time of construction of reactor facilities (approval of the welding method, welding inspection and pre-service inspection), and inspection after commissioning (facility Periodic Inspection), and it is prescribed in the Reactor Regulation Law that the corresponding provisions of the Reactor Regulation Law are exempted from application.

2) Electricity Utilities Industry Law

The Electricity Utilities Industry Law was established to ensure safety of public and to preserve environment by regulating construction, maintenance and operation of electric facilities, providing safety regulations for that purpose.

In view of ensuring safety of electric facilities used for electric utilities industry, the provisions on the Approval of Construction Plan, Fuel Assembly Inspection, Audit of Licensee’s Welding Check System, Pre-service Inspection, Periodic Licensee's Check, Audit of Licensee's Periodic Check System, Periodic Inspection, Operational Safety Program for Nuclear Facilities are defined in the Electric Utilities Industry Law.

The Minister of METI is required to make quarterly reports to the NSC on the status of regulatory activities, such as Approval of Construction Plan, Pre-service Inspection, Fuel Assembly Inspection, Periodic Inspection, and Audit of Licensee's Periodic Check System.

3) Basic Law for Emergency Preparedness and Special Law for Nuclear Emergency

The nuclear emergency had been addressed within the legal framework of the Basic Law for Emergency Preparedness. Taking account of the special characteristics of a nuclear emergency, the Special Law for Nuclear Emergency was established in December 1999.
The Law stipulates special measures for nuclear emergency, including licensee’s obligation for preventing nuclear emergency, the Declaration of Nuclear Emergency, and establishment of the Nuclear Emergency Headquarters, as well as activation of emergency measures in nuclear emergency. It also stipulates that Senior Specialists for Nuclear Emergency be stationed in the vicinities of nuclear installations, which guides and advises licensees in preparing preventive measures for nuclear emergency, and conducts other activities necessary to prevent the occurrence and progression of a nuclear emergency.

The volume for nuclear emergency preparedness in the Basic Plan for Emergency Preparedness in accordance with the Basic Law for Emergency Preparedness, clarifies the measures to be activated at each step of the occurrence of an abnormal event, progression into a nuclear emergency, and recovery from the emergency.

4) Laws for Radiation Protection

The radiation protection at nuclear installations is regulated by the Reactor Regulation Law, the Electricity Utilities Industry Law and the Industrial Safety and Health Law.

The Reactor Regulation Law stipulates zone control for radiation protection, dose control of personnel engaged in radiation work, measurement and monitoring of radiation levels, etc. in order to protect personnel and the public. The Electricity Utilities Industry Law prescribes the radiation instrument devices to be installed in nuclear installations. The Industrial Safety and Health Law defines the dose limits of personnel engaged in radiation work, which are equivalent to the Reactor Regulation Law. In accordance with the Law for Technical Standards of Radiation Hazards Prevention, the Radiation Council was established to take a consistency among technical standards for radiation hazards.

In order to prevent hazards due to the use of radioisotopes at nuclear installations, the Law Concerning Prevention from Radiation Hazards to Radioisotopes, etc.(hereinafter referred to as “Radiation Hazard Prevention Law”) stipulates zone control of radiation protection, dose control of personnel engaged in radiation work and radiation measurement in controlled area etc.

Relevant legislations were revised incorporating the ICRP Recommendation 1990 and enforced in April 2001.

5) Environment Impact Assessment Law

The Environmental Impact Assessment Law was enacted in June 1999, replacing the Decision of the MITI Departmental Council, July 1977, which stipulated the environmental impact assessment of nuclear installation other than safety assessment. The environmental impact assessment is implemented in accordance with the law.

The objective of the Environmental Impact Assessment Law is for licensees to perform
proper assessment of a large business plan which may pose large impact on the environment, and to prepare proper plan to preserve the environment. The law provides a set of procedures for it. Environmental assessment on commercial power plants, including nuclear installations, is performed in accordance with the provisions of the Environment Impact Assessment Law and the corresponding provisions of the Electricity Utilities Industry Law. The environmental impact assessment is obligatory for nuclear installation regardless of its scale.

6) Law on Compensation for Nuclear Damage

The Law on Compensation for Nuclear Damage establishes the basic system on compensation for nuclear damage caused by a nuclear accident.

The Law adopts the “liability without fault” principle and imposes sole liability of compensation for nuclear damage on licensees, exempting claimants from proving licensee’s fault in accordance with the general principle of the Civil Law. Also, infinite liability of compensation is imposed on the licensee.

To secure the fund of and to facilitate the compensation, the licensee is required to make the Financial Arrangement for Nuclear Damage Liability. The amount of the Arrangement is sixty billion yen for a nuclear installation in general.

The Arrangement consists of the Nuclear Damage Liability Insurance Contract with a civil insurer and the Indemnity Agreement for Compensation with the national government. The latter supplements the former in the case of large-scale accident such as caused by earthquake or volcanic eruption.

And in case the total amount arranged by the licensee is not sufficient for full compensation, the national government, on the basis of decision by the Diet, would aid to cover the licensee. In the case of enormous natural disaster or social disturbance, the national government bears the compensation, exempting licensee from liability for compensation.

(4) Provisions on Technical Requirements in the Safety Regulations

Technical requirements that will be used for review of basic design of nuclear installations are provided in the Guides for safety design and safety assessment established by the Nuclear Safety Commission. The system of the Guides is shown in Table 7-1. These Guides are used to assess the adequacy of licensee’s application for the license for establishment at the safety review and assessment of the application.

For technical requirements necessary for regulations at the subsequent stage such as approval of construction plan and the pre-service inspection after approval of establishment of a nuclear installation and the Periodic Inspection after commissioning, the Nuclear and Industrial Safety Agency (NISA) has established the technical standards as performance requirements. This system of technical standards is shown in Figure 7-2.
Furthermore, NISA uses the standards of the academic societies and associations that are standards of the private sectors, as the specification requirements to realize the performance requirements, after doing the technical evaluation. Major standards of academic societies and associations are shown in Table 7-2.

NISA also defines the internal regulatory guides, such as guidelines of various evaluations and review procedures.

As revisions of guides carried out after the previous report, the revised Regulatory Guide for Reviewing Seismic Design was issued in September, 2006 aiming at further improvement of seismic safety and reliability of nuclear installations (see Article 18). In order to verify the seismic safety of existing nuclear installations based on the revision, licensees were required to implement the seismic safety evaluation referring to the revised Regulatory Guide for Reviewing Seismic Design of Nuclear Power Reactor Facilities.

As revisions of technical standards carried out after the previous report, the technical standards that included specification requirements was revised to the ones that provide performance requirements only, and standards of academic societies and associations are used for providing specifications after evaluating the standards technically.

7.2 Legislative and Regulatory Framework at Each Stage

The overview of safety regulations on the basis of the Reactor Regulation Law, the Electricity Utilities Industry Law, etc. from planning stage through operation stage is shown in Figure 7-3. A summary of safety regulations for a commercial power reactor is stated in this section.

(1) Planning Stage

When selecting a site for a nuclear installation, the electric utility, on the basis of the Environmental Impact Assessment Law and the Electricity Utilities Industry Law, performs environmental impact assessment, and submits to METI the draft Environmental Impact Statement (draft EIS) explaining current status of the environment and measures to protect it. The draft EIS is sent to the related local governments to be disclosed for public comments. The utility prepares their views addressing residents’ comments. Assessments on air, water, and soil pollution due to radioactive substances are performed under the Reactor Regulation Law and exempted from application of the Environmental Impact Assessment Law.

METI conducts the evaluation, soliciting experts’ opinion.

In order to have opportunities to invite the opinions from the general public widely on various issues concerning establishment of the installation, the first public hearings with explanation of the electric power company are held by METI to obtain deeper understanding and cooperation of residents in the vicinity. The results of public hearings are taken into consideration in the safety examination..
(2) Establishment Stage

The license applicant, having completed the procedure of planning stage, submit application format for a license for establishment to the Minister of METI in accordance with the Reactor Regulation Law. Applicants attach documents to the application format including a description on safety design of the nuclear installation, radiation control, and accidents and failures.

NISA conducts an examination to determine the adequacy of the site, and the basic design of structure and equipment from the points of prevention of radiological hazards, focusing on the evaluation of the safety of the reactor core and the radiation exposure due to establishment of the nuclear installation. In addition, the regulatory body confirms that the nuclear installation should be used for peaceful purpose and in line with the planned development and utilization of nuclear energy, and the applicant has sufficient technical capability to ensure safety and sufficient financial basis to execute the plan.

In this examination, the regulatory guides in Table 7-1 and other documents established by the NSC are used. In the examination, site surveys, and analysis are conducted, when necessary.

The Minister of METI consults with the Atomic Energy Commission and the NSC on the results of its examination. During the review process of METI's results, the NSC reviews independently focusing on safety problems specific to the installation, and gives its views to the Minister of METI. The Minister of METI considers these views, asks for the consent of the Minister of MEXT, and then issues the license.

At the establishment stage, the second public hearing is held by the NSC to hear the opinions of residents in the vicinity on the safety specific to the facilities and take the opinions into consideration at the time when the NSC investigate and review the result of safety review and assessment by METI for the application of reactor establishment or alteration license applied by the electric power company. At the second public hearing, METI will explain the overview of safety review and assessment and present the view on the stated opinions. And NISA is conducting public relations activities positively to residents as provided in 8.3 (4) of this report.

In addition to these activities, Nuclear and Industrial Safety Subcommittee of the Advisory Committee for Natural Resources and Energy of METI invites opinions (Public Comments) when they formulate or alter fundamental policies, or newly introduce or alter the system which might affect the rights and duties of the people. When the NSC makes important policy decision or when Committee on Examination of Reactor Safety investigates and reviews the safety review and assessment, its executive office opens the contents of issue items for a fixed period of time to the public, and invites the opinion from the general public.

(3) Construction Stage

In accordance with the Electricity Utilities Industry Law, the licensee submits the Construction Plan for establishment of electric facilities, and obtains an approval of the
Minister of METI before starting construction works. NISA examines the Construction Plan to confirm that the detailed design of electric facilities is consistent with the basic design and design policies approved at the stage of licensing for establishment, and is in conformity with the technical standards based on the Electricity Utilities Industry Law. And the licensee must designate Chief Electrical Engineers and Chief Engineers of Boiler and Turbine and notify NISA of it.

After obtaining an approval or notification of the Construction Plan, the licensee shall undergo the Pre-Service Inspection by NISA at each process of construction and at the completion of all construction works, which confirms that construction is conducted in accordance with the construction plan and is in conformity with the technical standards. The licensee shall obtain design approval by NISA for fuel assemblies to be loaded in the reactor and undergo the Fuel Assembly Inspection conducted by NISA. The licensee shall perform Licensee’s Welding Check for welding of pressurized parts and containment vessels and shall undergo review by JNES on the organization conducting the inspection, the inspection method, schedule control, and other items provided by the ordinance of METI (Audit of Licensee's Welding Check System).

(4) Operation Stage

At the start of operation, the licensee must notify NISA of the operation plan, obtain an approval of the Operational Safety Program that prescribes procedures of operational management, operational limits and safety education of personnel, designate Chief Reactor Engineers, Chief Electrical Engineers and Chief Engineers of Boiler and Turbine, who supervise the safety of the operation, and the Persons Responsible for Operation, and notify NISA of them. The licensee is required to notify NISA of the operation plan annually.

The 17 items prescribed in the Operational Safety Program are provided in Reactor Regulation Law, which includes the Periodic Assessment, quality assurance, maintenance management, etc. of nuclear installations.

The licensee must control the radiation exposure of personnel engaged in radiation work so that their doses do not exceed the dose limit, and shall report the exposure dose of personnel to NISA periodically.

Licensees must discharge gaseous and liquid radioactive waste generated during operation into the environment, in compliance with the concentration values which are lower than the concentration limits stipulated in the Reactor Regulation Law. Licensees must make efforts to reduce discharge amount as small as possible so that annual public exposure in the vicinity will be kept below 50 μ Sievert in accordance with the Regulatory Guide for the Annual Dose Target for the Public in the Vicinity of Light Water Nuclear Power Reactor Facilities (hereinafter referred to, as the “Regulatory Guide for Annual Dose Target”).

After starting operation, the licensees, in accordance with the Electricity Utilities Industry Law, shall perform the Periodic Licensee’s Check to confirm that the installations conform to the technical standards. The records of the Periodic Licensee’s Check have to be stored by the
licensee for five years after decommissioning of the electric facilities. And fitness-for-service assessment is required to important part such as reactor pressure boundary. And also, the licensee must undergo the Periodic Inspection by NISA on the specified part of structures important to safety. The Periodic Inspection and the Periodic Licensee’s Check are conducted during shutdown of operation within the interval not exceeding 13 months from the date of start of operation or the date of completion of the previous inspection. Since October 2003, JNES has conducted part of the Periodic Inspection and notifies NISA of the results on the basis of the revision of the relevant laws. Also, licensees must undergo the Periodic Safety Management Review, in which JNES reviews the licensee’s organization conducting the Periodic Licensee’s Check, inspection method, schedule control, and other items provided in the ordinance of METI, and report the result to NISA for the evaluation. NISA shall evaluate the result comprehensively.

Licensees must undergo the Operational Safety Inspection by the Nuclear Safety Inspectors on the observance of the Operational Safety Program, including the licensee’s organization, quality assurance, maintenance management, operation, maintenance and repair of component, surveillance, radiation control, and management of radioactive wastes, discharge control of gaseous and liquid radioactive wastes, monitoring, and safety education. NISA conducts the On-site Inspection of nuclear installation to confirm compliance with safety regulation, if necessary.

If any failure occurs in a nuclear installation, the licensee must report the failure etc. immediately to NISA in accordance with the provisions of the Reactor Regulation Law and the Electricity Utilities Industry Law, and shall report to NISA, without delay, on the situation of the failure and the measures taken. In order to improve transparency of information to the public, the reporting criteria for failures etc. were more clearly defined by amending the Reactor Regulation Law in October 2003. Licensees have established the system to collect information on events, including minor events that are outside of the reporting criteria, and disclose them to the public.

Criteria for necessity of approval or notification of the Construction Plan for any modification or repair work of electric facilities after startup of operation was clarified by the amendment of the Rules for the Electricity Utilities Industry Law in October 2003. NISA established the “Regulatory Guide on the Construction Plan” to identify the details of the amendment and notified licensees of it.

MITI (present METI) issued, in 1992, a Decision of the METI Departmental Council to request licensees to voluntarily perform the periodic safety review at a regular operating interval (approximately every ten years), including incorporation of operating experiences from commissioning to date and the latest technological knowledge, and probabilistic safety assessment. On the basis of the amendment of the Reactor Regulation Law, in October 2003, the periodic safety review at a regular interval (approximately every ten years) was incorporated into the Operational Safety Program, the observance of which the Nuclear Safety Inspector inspects at the Operational Safety Inspection. In December 2005, NISA decided to include review with respect to enhancement of Measures for Aging Management and
degradation of licensee’s organizational climate. The implementation of probabilistic safety assessment, however, remains to be a voluntary activity of licensees as yet.

On the basis of the amendment of the Reactor Regulation Law, in October 2003, licensees were obliged to perform technical evaluation on ageing of nuclear installation before continuous operation more than thirty years and must prepare a ten-year maintenance plan based on the technical evaluation. The subsequent evaluation should follow within ten years. *In December 2005, NISA issued the Performance Guidelines for Measures for Aging Management and the Standard Review Procedures for Measures for Aging Management to complete measures for aging management.*

### 7.3 Record, Applicable Regulations and Enforcement of Terms of License

Licensees are obliged to record and save required items for operation and use of reactor for every nuclear reactor. The concrete items and the period are provided in the Rules on Establishment and Operation of Commercial Power Reactor.

In accordance with the Reactor Regulation Law, the Minister of METI may revoke the license for establishment or issue a Shutdown Order of nuclear installation for up to one year, under circumstances such as operating a nuclear installation without a license for establishment, violating an order legally issued by NISA, failing to implement measures necessary for safety prescribed by NISA, or failing to obtain approval for the Operational Safety Program.

The Reactor Regulation Law also prescribes imprisonment and/or fines under circumstances such as establishing a nuclear installation without a license for establishment, violating a Shut-Down Order, or failing to take relevant emergency measures, which are prohibited by the Law. NISA may order changes in the Operational Safety Program whenever it is deemed necessary for preventing potential radiological hazards. Licensees failing to abide by such orders would be punished with a fine.

In accordance with the Electricity Utilities Industry Law, if it is judged for an electric facility not to conform to the technical standards, the Minister of METI may order repair, alteration, relocation, temporary suspension of usage, or limitation of usage.

The Electricity Utilities Industry Law prescribes fines if a licensee violates a technical standard order for conformity, or establishes or alters an electric facility without obtaining necessary approval for a construction plan, or uses an electric facility without undergoing or passing the Pre-Service Inspection or the Fuel Assembly Inspection, or fail to receive the Audit of Licensee’s Welding Check System without performing Licensee’s Welding Check. It also prescribes to revoke the business license, if an electric utility violates the law or orders based on the law causing serious damage to the public benefits.

On the basis of the amendment of the Reactor Regulation Law in October 2003, when an employee violates a law and is punished by a fine, the legal person who legally employs him or her is also punished by a fine as heavy as 100 times of the employee’s fine, to prevent organizational illegal acts.
7.4 Change the Technical Standards for Nuclear Installations to Performance Requirements

The technical standard based on the Electricity Utilities Industry Law defines the technical requirements for nuclear installations. The previous technical standard included not only the performance requirements but also detailed specifications. The technical standard has been revised so that it only provides performance requirements which are necessary for safety and the detailed specifications for conforming to these performance requirements are to be defined by using standards of academic societies and associations.

The background, present status, basic policies to use, conditions as regulatory standards and methods of verification to change the technical standards including only performance requirements and the use of standards of academic societies and associations are as follows:

- **Background**

  The Japanese previous technical standards included detailed and concrete "specification requirements" on structures, materials and dimensions. Though those standards had advantages that the requirements are clear and judgment of success or failure can be made clearly and fairly, but, on the other hand, had disadvantages that the flexible responses to technological innovation or latest knowledge was not easy. This disadvantages will be solved, if the regulatory body defines “performance requirements”, describing only objectives or functions of safety equipments or facilities to achieve safety levels to be considered as necessary by the regulatory body, and detail specifications conforming to the performance requirements are defined separately by using “detailed specifications” established by specialists of each field by collecting their knowledge. In recent years, it has been socially demanded that the technical standards shall be defined as “performance requirements” as much as possible in order to reflect promptly domestic and overseas operating experiences, latest knowledge etc. into “detailed specifications”

- **Present status**

  In Japan, there are standards of private sectors which have been established independently by industries such as guidelines and rules of the Japan Electric Association (JEAC, JEAG etc.), and most of them have been used by licensees. However, they were not included in the regulatory standards officially and remained as reference information. These standards have been regarded as “independent standards of private sectors” established by industries. Recently, academic societies and industrial associations, such as the Japan Society of Mechanical Engineers, the Atomic Energy Society of Japan as well as the Japan Electric Association establish the standards of private sectors with emphasis on fairness, justice and openness taking a process to be reviewed by neutral and fair members in the public. And these standards are decided to be used officially, calling "standards of academic societies and associations."

- **Basic policies to use the standards of academic societies and associations by NISA**
(1) Regulatory standards specify performance requirements, and standards of academic societies and associations are positively used to establish specifications to realize the performance requirements.

(2) When the standards of academic societies and associations used by licensees are proved to be the standards which conform to the performances required by NISA, NISA shall open the fact after technical evaluation of the Standards.

(3) When applicable standards of academic societies and associations do not exist, NISA encourages its establishment, and until establishment of the standard, the performance, that will be realized by the fulfilling the conventional specifications, is regarded as the performance standards required by regulatory standards.

- Conditions of standards of academic societies and associations as regulatory standards and its verification

When the standards of academic societies and associations are confirmed to fulfill the following conditions, it is regarded that the regulatory standards are satisfied;

(1) It corresponds to the items representing performances required by the regulatory standards,

(2) Concrete methods or specifications on technical matters necessary to achieve performances required by the regulatory standards are provided, and

(3) Technical adequacy has been proven for the concrete methods or specifications provided in the standards of academic societies and associations.

No matter what organization of academic societies and associations have established the standards, they are judged to satisfy the performance required by the regulatory standards, if it can be confirmed that they have been established by the process with emphasis on fairness, justice and openness and that they fulfill the above three conditions. The regulatory body make judgment promptly, in order to make the regulation effective and efficient with respect for the technical knowledge of specialists participated in the development process.

- Present status regarding use of standards of academic societies and associations and future policy

An amendment of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (Ordinance of METI, No. 62, 1965), which is for the purpose to execute the above mentioned policies, was promulgated on July 1, 2005 and enforced on January 1, 2006 after announcement to the World Trade Organization (WTO) and invitation of public comments.

In practicing the above ministerial order, when corresponding standards of academic
societies and associations exist, NISA clearly specifies the application of them in the “Interpretation” of the Technical Standards, Ordinance No. 62, after technical evaluation, and when corresponding standards of academic societies and associations do not exist, the items which NISA requires are shown in the “Interpretation”.

As of March 31, 2007, 21 standards of academic societies and associations were evaluated technical adequacy by NISA.

NISA will perform further technical evaluation of standards of academic societies and associations whenever they are prepared.
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Table 7-2-3 Standards etc. of Academic Societies and Associations  
(Guidelines and Rules of the Atomic Energy Society of Japan)

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<tr>
<td>AESJ-SC-P003:2003</td>
<td>Performance Criteria of Wind Tunnel Test to obtain the effective height of Discharge Source</td>
</tr>
<tr>
<td>AESJ-SC-F006:2006</td>
<td>Safety Design and Inspection Criteria for Transfer Container for Spent Fuels, New Mixed Oxide Fuels, and High Level Radioactive Wastes</td>
</tr>
</tbody>
</table>
Table 7-2-4 Standards etc. of Academic Societies and Associations
(Guidelines and Rules of the Thermal and Nuclear Power Engineering Society)

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNS-S3121-2003</td>
<td>Qualification Standards for Industry Product on Weld of Electric Facilities</td>
</tr>
<tr>
<td>JBWR-NCG-01-2005 (*)</td>
<td>Guidelines for Accumulation Prevention of Mixed Gas (Hydrogen and Oxygen) inside BWR Piping</td>
</tr>
</tbody>
</table>

Note: * Standards etc. of academic societies and associations that NISA has evaluated their technical adequacy in order to utilize as exemplification standards of specification codes.
Fig. 7-1 Major Legislations Governing the Safety Regulation of Nuclear Installations
Fig. 7-2 Systems of Technical Standards
Fig. 7-3 Flow of Safety Regulations based on Legislations, etc. for Nuclear Installations
**Article 8 Regulatory Body**

1. Each contracting Party shall establish or designate the regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 7, and provided with adequate authority, competence and financial and human resources to fulfill its assigned responsibilities.

2. Each Contracting Party shall take the appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organization concerned with the promotion or utilization of nuclear energy.

The regulatory body for ensuring the safety of facilities and activities for utilization of nuclear energy in Japan is the Nuclear and Industrial Safety Agency (hereinafter referred as "NISA"). NISA, based on The Law on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors etc. (hereinafter referred to as the "Reactor Regulation Law etc."), has definite authority and power on safety regulations. Moreover, the Nuclear Safety Commission (hereinafter referred to as the "NSC") established in the Cabinet Office supervises and audits the regulatory activities of NISA. NISA is ensured to be effectively independent from other agencies or organizations that manage matters for the promotion of nuclear energy utilization.

In addition, the Japan Nuclear Energy Safety Organization (JNES) was established under the authority of METI, and is performing part of the Operational Safety Inspection for nuclear installations in accordance with the Reactor Regulation Law and the Electricity Utilities Industry Law, and is supporting NISA.

Since the previous report, NISA has conducted the Audit of Licensee's Periodic Check System etc. in order to promote firm establishment of the inspection system revised in 2003, and has reported the results of the said Audit to the NSC. Also, corresponding to the NSC’s result of supervision and audit on regulatory activities of NISA, NISA is making an effort to reform the regulations further. NISA also introduced the NISA Work Management System for improving the transparency and efficiency of NISA’s work.

In addition, NISA, together with the NSC, invited the Integrated Regulatory Review Services (IRRS) by the International Atomic Energy Agency (hereinafter referred to as the “IAEA”) in 2007, in order to receive an international review concerning the nuclear-safety-regulatory activities. Concerning the independency of the regulatory body from promotion organizations, the IRRS showed that "NISA is effectively independent from the Agency of Natural Resources and Energy (hereinafter referred to as the “ANRE”) in correspondence with the GS-R-1 (international standard of the IAEA). Moreover, this situation could be reflected in the legislation more clearly in future."  

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1 The IRRS Report is under the preparation by the IAEA at the time of this publication.
8.1 Mandate and Duties of the Regulatory Body

The mandate of the regulatory body is to ensure the safety of nuclear installations, and its duties are to enforce the legislative and regulatory framework described in the report of Article 7.

One of the important requirements for the regulatory body satisfying his responsibility is, as indicated in Article 8, Paragraph 2 of this Convention, to ensure effective separation between functions of the regulatory body and those of any other body or organization concerned with the promotion or utilization of nuclear energy. Another important function of the regulatory body is to keep communicating independently with the public of its regulatory decisions, its opinions and its basis.

On the basis of the Atomic Energy Basic Law, the regulatory body is responsible to conduct regulatory activities prescribed in the Reactor Regulation Law, the Electricity Utilities Industry Law, etc. As for legislations and regulations etc. applied to the examination of the basic design or basic design policies of nuclear installations and to the inspection of nuclear installations in the construction and operational stages, NISA and the NSC work toward improvement and enhancement of legislations and regulations based on operating experiences, trends of the latest knowledge of the technology advancement, etc., and the international consensus.

In the case of a nuclear emergency, the Basic Law on Emergency Preparedness, the Special Law of Emergency Preparedness for Nuclear Disaster and other related laws are applied. Relevant administrative bodies in such a case are described in the report of article 16.

8.2 Organizations for Enforcement of the Safety Regulation of Nuclear Installations

In Japan, the Minister of Economy, Trade and Industry (hereinafter referred to as “METI”) serves as the minister in charge of safety regulation for all facilities and activities concerning the utilization of nuclear energy. NISA has been established in METI as an independent "special organization" dedicated to the administration of safety regulations.

NISA has been executing policies independently from the Agency of Natural Resources and Energy dedicated to promote nuclear energy. The incorporated administrative agency, JNES was established in October 2003. JNES, together with NISA, provides infrastructure to assure safety in the use of the nuclear energy.

The NSC and the Atomic Energy Commission (AEC) were established in the Cabinet Office. The commissioners of both of these commissions are appointed by the Prime Minister with the consent of the Diet.

Each of these two commissions’ plans, deliberates, and decides policies concerning either nuclear power application or ensuring the safety, from the standpoint to regulate respectively in the country as a whole.
As described in the report of Article 7, NISA conducts a safety examination of nuclear installations, and the Minister of METI consults the NSC and the AEC on the results of the examination.

The NSC submits to the Minister of METI a report, after an independent examination and public hearings on the specific safety of the nuclear installation. The NSC establishes guides to be used for the examination.

Fig. 8-1 presents an overview of administrative organizations that are responsible for the safety regulation of nuclear installations.

### 8.3 Nuclear and Industrial Safety Agency (NISA)

(1) The Role of NISA

NISA administers the safety regulations for nuclear installations. Specifically, NISA, entrusted by the Minister of METI, conducts clerical work concerning the competence of the Minister of METI as follows:

The Minister of METI, who is the competent minister stipulated in the Reactor Regulation Law, has the authority to issue licenses for establishment of nuclear installations, after conducting the examination of siting, structure, and equipment, so that a radiological hazard due to establishment of a nuclear installation is prevented. The Minister of METI has the authority to revoke a license under circumstances such as violation of the Reactor Regulation Law by the licensee.

The Minister of METI has the authority to establish ministerial orders concerning measures for the safe operation and physical protection of specific nuclear fuel material, the Operational Safety Program, Chief Engineer of Reactors, measures in emergency, etc. for the operation of reactors. The Minister of METI has the competence of authorizing the Operational Safety Program, approval of the operation plan and decommissioning plan of nuclear installations, accepting the notification concerning appointment/dismissal of Chief Engineers of Reactors, collecting reports from licensees and conducting On-site Inspection of the licensees, revocation or discontinuance of utilization of a license for establishment of a nuclear installation, ordering of measures for safe operation etc., approval of a Chief Engineer of Reactors, an order on measures for safe operation etc., dismissal order of a Chief Engineer of Reactors, implementation order concerning a decommissioning, implementation order for an emergency preparedness, etc.

The Minister of METI, and the Minister of MEXT, conducts examinations for Chief Engineers of Reactors and issues the licenses. The Minister of METI has the authority also to order to return such licenses in a case of violation of the law by the Chief Engineers.

The Minister of METI, who is the competent minister stipulated in the Electricity Utilities Industry Law, has powers to establish ministerial ordinances relating to the technical standard, pre-service inspection, the fuel assembly inspection, the Audit of Licensee’s Welding Check
System, the Periodic Inspection, and the Audit of Licensee’s Periodic Check System. The Minister of METI has powers to conduct approval of the construction plan, the pre-service inspection including verification of the safety performance of a whole power station, the fuel assembly inspection, the Periodic Inspection, and to issue an Order for Conformity to the technical standards when a case of nonconformity to the technical standards is found. The Minister of METI has powers also to hold the affairs of examinations for Chief Electrical Engineers, to issue licenses for the Chief Electrical Engineer and the Chief Engineer of Boiler and Turbine, and to order the return of such licenses in case of violation of the law by a Chief Engineer.

NISA evaluates results of the Audit of Licensee’s Periodic Check System performed by JNES. In the Audit of Licensee's Periodic Check System, JNES evaluates the organization, inspection methods, process control, and other matters of a licensee concerning implementation of the periodic licensee's check, which are determined by a METI ordinance.

NISA evaluates also the results of the Audit of Licensee’s Welding Check System performed by JNES.

(2) Organization of NISA

NISA was established as a "Special Organization" in METI, and has 11 divisions dedicated to the administration of the safety regulation of nuclear installations (including nuclear fuel cycle facilities).

They are Policy Planning and Coordination Division, Nuclear Safety Public Relations and Training Division, Nuclear Safety Regulatory Standard Division, Nuclear Safety Special Investigation Division, Nuclear Power Licensing Division, Nuclear Power Inspection Division, Nuclear Fuel Transport and Storage Regulation Division, Nuclear Fuel Cycle Regulation Division, Radioactive Waste Regulation Division, Nuclear Emergency Preparedness Division and Electric Power Safety Division. The assigned duties of those divisions are provided in Table 8-1.

Nuclear Safety Inspectors are assigned to each site of the nuclear installations. Fig. 8-2 shows the locations of the Nuclear Safety Inspectors Offices.

NISA has a total of approximately 350 staff engaged in the nuclear safety regulation, out of which 100 staff members are Nuclear Safety Inspectors and Senior Specialists for Nuclear Emergency stationed at nuclear installations.

(3) Quality Improvement of NISA’s Regulatory Activities

NISA provides a strong commitment to its mission, scientific and reasonable judgments, transparency, neutrality and fairness as the code of conduct for their activities. In this context, the Policy Planning and Coordination Division watches and assesses the performance of other divisions of NISA in discharging their duties, and take timely remedial actions after consulting with the senior managements. In order to improve the quality of regulatory
activities, the development of the NISA Work Management System started in fiscal year 2006 and implemented from fiscal year 2007. According to the NISA Work Management System, NISA’s goals in the medium term and tasks in fiscal year 2007 were released in June, 2007.

The NSC, an independent organization from NISA, supervises and audits the appropriateness of NISA’s regulatory administration in the construction and operation stages after issuance of the license, from the viewpoint of rationality, effectiveness and transparency. Thus, the framework that confirms the quality of the safety administration is maintained.

In addition, NISA makes a continuous effort to maintain the high quality of regulation through education and training of the personnel as stated in the report of Article 11, international activities and the hearing of advice from experts e.g. members of the Nuclear and Industrial Safety Subcommittee (hereinafter referred to as the “NISS”).

The "Law for Evaluation of the Policies Executed by Administrative Organizations" was enforced in April 2002, and in accordance with this law, a framework, with which each administrative organization of the government evaluates and improves his own policies systematically, was built. METI has developed plans to evaluate the regulatory systems within its jurisdiction in fiscal year 2004, and NISA, according to these plans, evaluates the nuclear safety regulation system on the basis of the Reactor Regulation Law and the Electricity Utilities Industry Law.

(4) Further Approach to Information Disclosure

NISA started information service activities systematically in the form of integrating with the regulatory work process in September 2001, introducing relationship management (RM) as a new effort, which makes the feedback from the outside into a qualitative operation of regulatory activities, and is promoting positive information disclosure activities. The objectives of the RM are to make effort for improvements in recognition of NISA’s responsibility, in the people’s understandings about NISA’s daily activities, in ensuring a steady response to the people’s concerns, in establishing consent to a better regulatory system, in the preparation to an emergency, and in the activation of internal communication.

In April 2004, NISA allocated a new budget in order to enhance further activities to hear from the public, and at same time, established the Nuclear Safety Public Relations and Training Division newly formed in NISA, and appointed the Resident Public Relations Officers. The main activities of NISA from fiscal year 2004 to fiscal year 2006 were as follows, (1) NISA executive’s visit and give explanation of NISA’s policy and activities to the local government (133, 113 and 64 visits in fiscal year of 2004 to 2006, respectively ), (2) publication of newsletters and mail magazines, (3) explanation of policies and activities of the nuclear safety regulation to the general public, (public meeting on the clearance system and amendment of the Reactor Regulation Law, Pu-thermal symposium, public meeting on seismic safety, "one-day seminars to introduce NISA" were held in major cities and site municipalities), (4) making direct dialogue group communication with site area residents (in fiscal year 2006, "dialog meetings" were held at ten places across the country, such as Tomari-mura, Hokkaido
and Genkai-cho, Saga-Prefecture), (5) activities to hear from the public at the Nuclear Safety Inspector's Offices, (6) implementation of risk-communication technical training for local-government personnel etc., (7) introduction of NISA and Nuclear Safety Inspectors Offices; editing of a video explaining about essential policies, such as the new inspection system by managements themselves and televising by site area CATVs and placing such information on a homepage.

Also, NISA opens the Nuclear Energy Library in JNES, where the public can access documents for the reactor establishment license, reports of incidents and accidents of nuclear installations and, books and booklets on energy and nuclear power generation.

8.4 Organizations related to NISA

(1) Council etc.

On the basis of the Law for Establishment of the Ministry of Economy, Trade and Industry, the Advisory Committee for Natural Resources and Energy (hereinafter referred to as the “ACNRE”) was established, a subcommittee of which is the NISS that proposes policies on nuclear safety and safety of electric power as terms of reference. The organization of the NISS is given in Table 8-2.

The Minister of METI appoints members of the ACNRE from persons of knowledge and experience, and these members select a chairperson of the ACNRE mutually. Subcommittees are established by a resolution of the ACNRE, and the chairperson designates members of the subcommittees including the NISS. The members of the subcommittees are assigned based on their expertise and experience from the fields of nuclear and thermal-hydraulic design, nuclear fuel design, system design, equipment design, seismic design, material strength, radiation control, meteorology, geology, soil etc.

"What challenges exist in the future in order to assure safety in nuclear power generation and safety in the electric power system operation, while under rapid social and economical change" were entrusted to NISS to be discussed. The NISS and other subcommittees have deliberated on what nuclear safety regulation systems should be, and the results were reported to NISA.

NISA solicits views of experts and members of NISS.

(2) JNES

JNES, consisting of about 420 officers and staff, was established in October 2003 as an organization that establishes the infrastructures in cooperation with NISA to ensure the safety of utilization of nuclear energy.

The mission of JNES is to implement its duties with full application of its technical and engineering competence based on scientific judgments to contribute to the improvement of nuclear safety regulation and, to deliver and transmit actively the safety information to the public.
JNES is expected to ensure the nuclear safety and build the confidence of the people in nuclear safety by implementing such duties.

JNES implements the following activities:

- Inspection of nuclear installations and reactor facilities, and related work,
- Safety analysis and evaluation of designs of nuclear installations and reactor facilities;
- Work for the establishment of nuclear emergency preparedness, prevention of the escalation of a nuclear emergency (including minimization of the probability of occurrence of a nuclear emergency), and restoration from a nuclear emergency;
- Investigation, testing, research, and training to ensure safety in utilization of nuclear energy; and
- Collection, analysis and delivery of information to assure nuclear safety.

The procedures for JNES to implement activities, keeping in relation with NISA of METI, are as shown in the following:

- NISA develops a goal on each activity based on the regulatory needs, and defines the medium-term objectives in accordance with the Act on General Rules for Incorporated Administration Agencies, and the Minister of METI assign them to JNES.
- JNES prepares a scheme (medium-term scheme) to accomplish the medium-term objectives, applies for and obtains the approval of the scheme to the Minister of METI,, then JNES prepares a program in accordance with the medium-term scheme for every FY term, notifies the program to the said minister and implements it.

8.5 The NSC

The Atomic Energy Basic Law was partially revised on October 4, 1978 to establish the NSC under the Prime Minister’s Office. The NSC administers the function of safety regulation, had belonged to the AEC up until then, in order to strengthen the system of ensuring nuclear safety. (The NSC was transferred from the Prime Minister’s Office to the Cabinet Office due to central government reform in January 6, 2001.)

The NSC is responsible for planning, deliberation and decisions on matters that are related to ensuring safety of the research, development, and utilization of nuclear energy.

The NSC conducts its own review of the results of NISA’s examination on the application from the view points of the licensee’s technical capability and non hindrance to the prevention of radiological hazards. The NSC supervises and audits the appropriateness of NISA’s regulatory administration in construction and operation stages after issuance of the license, from the viewpoint of reasonableness, effectiveness and transparency. Thus, the framework
that confirms the quality of the safety administration is maintained.

When the NSC deems it necessary as a part of its assigned duties, the NSC may recommend and may request reports and cooperation concerning the submission of materials, statements of viewpoint, and explanation to the heads of relevant administrative organizations, by way of the Prime Minister.

Since April 2003 (partially, from October 2003), the above functions have legally been enacted. The NSC receives from NISA the following; reports on the quarterly bases after the approval of a license to establish nuclear installations: reports concerning the conduct of the regulatory activities such as approval of the construction plan, pre-service inspection, Periodic Inspection, Audit of Licensee's Periodic Check System, Audit of Licensee's Welding Check System, Approval of Operational Safety Program, implementation states of regulations, such as the Operational Safety Inspection, report of accidents and failures of nuclear installations. The NSC also has the authority to inquire directly of the licensees, maintenance and inspection contractors in order to supervise and to audit the safety regulation implemented by regulatory body.

In the case of a violation of safety regulations in any of nuclear facilities, the employee can directly allege the fact to the NSC, and the NSC has the authority to investigate the allegation.

The Minister of METI, before issuing a license to establish nuclear installations, must receive the viewpoint of the NSC on the following matters: (1) that the applicant for the license of a nuclear installation has adequate technical capability to establish and reliably operate a nuclear reactor, and (2) that the site, structures and equipment of the nuclear installation would not cause any hindrance to the prevention of radiological hazards.

The NSC is composed of five commissioners appointed by the Prime Minister with the consent of the Diet, and these commissioners elect a chairman among them. General affairs of the NSC are performed by the NSC Secretariat of the Cabinet Office. The NSC Secretariat is composed of the Secretary-General, the General Affairs Division, the Regulatory Guides and Review Division, the Radiation Protection and Accident Management Division and the Subsequent Regulation Review Division and has about 100 personnel.

Under the NSC, two safety examination committees, eight special committees and seven others are organized as shown in Table 8-3. The Special Committees may organize working groups under them, if necessary.

The members of the Committee on Examination of Reactor Safety and the Committee on Examination of Nuclear Fuel Safety are appointed from persons of knowledge and experience by the Prime Minister in accordance with the Law for Establishment of the Atomic Energy Commission and the Nuclear Safety Commission. The Emergency Technical Advisory Body is composed of the commissioners of the NSC and the commissioners on the Emergency Technical Advisory Body who are also appointed by the Prime Minister from persons of knowledge and experience.
Results of the investigation and evaluation by each review board and special committee are reported to the NSC and are deliberated by the NSC. Reflecting the results of the discussion in the Emergency Technical Advisory Body, the NSC determine the recommendation items for an emergency.

Deliberations of all committees, including the special committees and working groups under the NSC are open to the public. The contents of the deliberations are provided for the public on a homepage (http://www.nsc.go.jp/) and at the Nuclear Energy Library.

8.6 The AEC

The AEC was established under the Prime Minister's Office on January 1, 1956, on the basis of the Atomic Energy Basic Law and the Law for Establishment of the Atomic Energy Commission and the Nuclear Safety Commission, to conduct national policy concerning research, development and utilization of nuclear energy in a planned manner and to ensure the democratic administration of the nuclear energy policy. (The AEC was transferred to the Cabinet Office in January 2001.)

The AEC has duties of planning, deliberation, and decisions concerning the research, development and utilization of nuclear energy (excluding matters relating to regulations on ensuring safety).

If the AEC deems it necessary as part of its assigned duties, it may advise by way of the Prime Minister, and request reports and cooperation including the submission of materials, statements of viewpoint, and explanation from the heads of relevant administrative organizations.

The Minister of METI, before issuing a license to establish nuclear installations, shall receive views of the AEC with regard to the following items: (1) the nuclear installations will not be used for any purposes other than peaceful purposes, (2) the license will cause no hindrance to the planned development or utilization of nuclear energy, and (3) the applicant has an adequate financial basis to construct and maintain the nuclear installations.

The AEC is composed of a chairman and four other commissioners appointed by the Prime Minister with the consent of the Diet.

8.7 Other Administrative Bodies

Establishment of nuclear installations necessitates the compliance with other laws such as the Fire Protection Law and the Port Regulation Law. Therefore, the relevant safety regulations are conducted by the relevant government offices e.g. the Fire Protection Agency and the Ministry of Land, Infrastructure and Transport.
### Table 8-1 Assigned Duties of the Divisions Related to Safety Regulation of Nuclear Installations (including nuclear fuel cycle facilities), NISA, METI

<table>
<thead>
<tr>
<th>Division</th>
<th>Duties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Planning and Coordination Division</td>
<td>- Planning and coordination the general policy of the NISA</td>
</tr>
<tr>
<td>Nuclear Safety Public Relations and Training Division</td>
<td>- Activities for public hearing and public relations concerning the nuclear safety</td>
</tr>
<tr>
<td></td>
<td>- Administration of the Nuclear Safety Inspectors and Senior Specialists for Nuclear Emergency Preparedness</td>
</tr>
<tr>
<td></td>
<td>- Training and education of personnel to gain and to improve their competency</td>
</tr>
<tr>
<td>Nuclear Safety Regulatory Standard Division</td>
<td>- Planning and coordination concerning technology and the system to ensure the nuclear safety</td>
</tr>
<tr>
<td></td>
<td>- Regulation of nuclear power reactors in the stage of research and development</td>
</tr>
<tr>
<td></td>
<td>- Research and development, etc.</td>
</tr>
<tr>
<td>Nuclear Safety Special Investigation Division</td>
<td>- Management of allegation and litigation concerning nuclear safety</td>
</tr>
<tr>
<td>Nuclear Power Licensing Division</td>
<td>- Regulation of commercial power reactors in the design and construction stage</td>
</tr>
<tr>
<td>Nuclear Power Inspection Division</td>
<td>- Regulation of commercial power reactors in the operation stage</td>
</tr>
<tr>
<td>Nuclear Fuel Transport and Storage Regulation Division</td>
<td>- Regulation of spent nuclear fuel storage business</td>
</tr>
<tr>
<td></td>
<td>- Regulation concerning transportation of nuclear fuel materials from sites</td>
</tr>
<tr>
<td>Nuclear Fuel Cycle Regulation Division</td>
<td>- Regulation concerning businesses of refining, processing, fabrication, spent-fuel storage, and reprocessing</td>
</tr>
<tr>
<td>Radioactive Waste Regulation Division</td>
<td>- Regulation of radioactive waste business, dismantling and decommissioning of nuclear installations including nuclear fuel cycle facilities</td>
</tr>
<tr>
<td>Nuclear Emergency Preparedness Division</td>
<td>- Planning of nuclear emergency preparedness</td>
</tr>
<tr>
<td></td>
<td>- Prevention and investigation of incidents and accidents in nuclear businesses</td>
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<td></td>
<td>- Administration of activities in a nuclear emergency</td>
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<tr>
<td></td>
<td>- Matters concerning physical protection</td>
</tr>
<tr>
<td>Electric Power Safety Division</td>
<td>- Regulation of welding for electric structures</td>
</tr>
<tr>
<td></td>
<td>- Environmental impact assessment</td>
</tr>
<tr>
<td>Subcommittee</td>
<td>Activities</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Basic Safety Policy Subcommittee</td>
<td>General matters securing safety</td>
</tr>
<tr>
<td>Nuclear Reactor Safety Subcommittee</td>
<td>Technical matters on commercial power reactors and power reactors at the stage of research and development</td>
</tr>
<tr>
<td>Nuclear Fuel Cycle Safety Subcommittee</td>
<td>Fabrication and reprocessing of nuclear fuel, storage of spent fuel, transportation of nuclear fuel material, and the technical standards</td>
</tr>
<tr>
<td>Decommissioning Safety Subcommittee</td>
<td>Decommissioning of nuclear installations*</td>
</tr>
<tr>
<td>Radioactive Wastes Safety Subcommittee</td>
<td>Securing safety of disposal and storage of radioactive wastes</td>
</tr>
<tr>
<td>Seismic and Structural Design Subcommittee</td>
<td>Technical matters on seismic safety and structural integrity of nuclear installations</td>
</tr>
<tr>
<td>Nuclear Emergency Preparedness Subcommittee</td>
<td>- Measures for incidents and failure, and general crisis management for emergencies of nuclear installations* and physical protection of nuclear material</td>
</tr>
<tr>
<td>INES Evaluation Subcommittee</td>
<td>INES Evaluation on incidents and accidents of nuclear installations*</td>
</tr>
<tr>
<td>Subcommittee for the Convention on Nuclear Safety</td>
<td>Matters related to the Convention on Nuclear Safety and international standards on nuclear safety</td>
</tr>
<tr>
<td>Electrical Power Safety Subcommittee</td>
<td>Securing safety of electrical power</td>
</tr>
<tr>
<td>Study Group on the Way of Inspection</td>
<td>Matters concerning the inspection system of nuclear power generation facilities and nuclear fuel cycle facilities</td>
</tr>
<tr>
<td>Subcommittee for the Institution of Nuclear Safety Regulation</td>
<td>Study of the legal system for the prevention of falsification of the self-controlled inspection record based on the investigation of the background of the falsification</td>
</tr>
<tr>
<td>Subcommittee for Fitness-for-Service Assessment etc. of nuclear power system</td>
<td>Study of the following, in the cases where a plant has cracks in a core shroud or reactor coolant re-circulation system piping: (1) Verification of validity in the check methods for core shroud etc. (2) Technical fitness-for-service assessment judgment method (3) Fitness-for-service verification etc. of individual plants based on check results specifically</td>
</tr>
<tr>
<td>Nuclear Safety Infrastructure Subcommittee</td>
<td>Study of the current state and issues etc. of safety infrastructure (safety infrastructure study, codes and standards, human-resources infrastructure, study of facility infrastructure, knowledge base)</td>
</tr>
<tr>
<td>Aging Countermeasure Examination Committee</td>
<td>Clarification of the requirements used as the rationale of measures for aging management, guidelines, etc. and study about the way of the reasonable safety inspection by the government</td>
</tr>
</tbody>
</table>

*: Including nuclear fuel cycle facilities
| Committee on Examination of Reactor Safety | Matters concerning the safety of nuclear reactor facilities |
| Committee on Examination of Nuclear Fuel Safety | Matters concerning the safety of nuclear fuel material |
| Emergency Technical Advisory Body | Technical advice in emergency measures in case of occurrence of an accident or a failure that meet the given standard level in nuclear installation etc. |
| Emergency Technical Advisory Body for Disaster Prevention of Nuclear Carriers | Technical advices in emergencies/ disasters of nuclear carriers |
| Emergency Technical Advisory Body for Disaster Prevention due to armed attack | Technical advices in nuclear emergencies/ disasters due to armed attacks |
| Special Committee for Nuclear Safety Standards and Guides | Matters concerning safety standards and guides of nuclear reactors, nuclear fuel facilities, and other nuclear installations |
| Special Committee on Radioactive Waste and Decommissioning | Matters concerning safety assurance in radioactive waste disposal |
| Special Committee on Radioactive Waste and Decommissioning | Matters concerning the safety assurance in decommissioning nuclear installation |
| Special Committee on Safety Goals | Establishment of safety goals |
| Special Committee on Radiation Protection | Matters concerning the radiation protection considering domestic and international trends |
| Special Committee on Safety Transport of Radioactive Materials | Matters concerning the safety assurance in transportation of radioactive materials considering domestic and international trends |
| Special Committee on Analysis and Evaluation of Nuclear Accidents and Failures | Analysis and evaluation of domestic and international nuclear accidents and failures |
| Special Committee on Nuclear Safety Research | Planning of nuclear safety research programs |
| Special Committee on Nuclear Safety Research | Monitoring of the nuclear safety research programs |
| Special Committee on Nuclear Safety Research | Evaluation of the nuclear safety research programs |
| Special Committee on Nuclear Disaster | Emergency preparedness in the vicinity of nuclear installations, etc. |
| Task Force for introduction of Safety Regulations Using Risk Information | Review and analyses of the issues in the introduction of safety regulation using risk information |
| Project Team on Safety Survey of Reprocessing Facilities | Survey and analysis of matters relevant to the safety regulation activities during the test operation of the Rokkasho reprocessing facility |
| Safety Investigation on Disposal of Specialized Radioactive Wastes | Technical matters concerning the safety assurance in the final disposal of high-level radioactive wastes |
| Investigation Project Team on Seismic Safety of Nuclear Facilities | The review of Results of Seismic Safety Re-evaluation of Existing Plants |
| Investigation Project Team on Seismic Safety of Nuclear Facilities | Matters concerning the newest knowledge on seismic safety |
Administrative Organization for Supervision and Auditing of Regulatory Activities

Prime Minister
Cabinet Office

Nuclear Safety Commission

Secretary - General

Management and Coordination Division
Regulatory Guides and Review Division
Radiation Protection and Accident Management Division
Subsequent Regulation Review Division

Administration Organization for Regulatory Activities

Minister
Ministry of Economy, Trade and Industry

Director-General
Nuclear and Industry Safety Agency

Director-General for NISA,
Deputy Directors-General,
Deputy Director-General for Safety Examination

Policy Planning and Coordination Division
Nuclear Safety Public Relations and Training Division
Nuclear Safety Regulatory Standard Division
Nuclear Safety Special Investigation Division
Nuclear Power Licensing Division
Nuclear Power Inspection Division
Nuclear Fuel Cycle Regulation Division
Nuclear Fuel transport and Storage Regulation Division
Radioactive Waste Regulation
Nuclear Emergency Preparedness Division
Electric Power Safety Division
Nuclear Safety Inspectors

Incorporated Administration Agency,
Japan Nuclear Energy Safety Organization

(Established in accordance with the General Rules for the Incorporated Administrative Agency and the Law for the Incorporated Administrative Agency, Japan Nuclear Energy Safety Organization)

(Located in 17 sites of the Nuclear Power Plants)

Fig. 8-1 Outline of the Safety Administrative Organization for Nuclear Installations (including the Nuclear Fuel Cycle)
Fig. 8-2 Establishment of Nuclear Safety Inspectors Offices
As of August 31, 2007

- Tomari Nuclear Safety Inspectors Office
  Units 1 & 2 <PWR> (In operation), Tomari PS, Hokkaido Electric Power Co.
  Units 3 & 4 <PWR> (Under construction)
  Genkai NPS, Kyushu Electric Power Co.

- Kashiwazaki-kariwa Nuclear Safety Inspectors Office
  Units 1, 2, 3, 4 & 5 <BWR>, Units 6 & 7 <ABWR> (In operation)
  Kashiwazaki-kariwa NPS, Tokyo Electric Power Co.

- Shika Nuclear Safety Inspectors Office
  Unit 1 <BWR> & Unit 2 <ABWR> (In operation), Shika NPS, Hokuriku Electric Power Co.

- Tsuruga Nuclear Safety Inspectors Office
  Unit 1 <BWR> & Unit 2 <PWR> (In operation), Tsuruga NPS, the Japan Atomic Power Company
  Fugen <ATR> (Under decommissioning setup) & Monju <FBR> (Under construction, First Criticality Attained)
  Japan Atomic Energy Agency

- Mihama Nuclear Safety Inspectors Office
  Units 1, 2 & 3 <PWR> (In operation), Mihama PS, the Kansai Electric Power Co., Inc

- Ohi Nuclear Safety Inspectors Office
  Units 1, 2, 3, & 4 <PWR> (In operation), Ohi PS, the Kansai Electric Power Co., Inc

- Takahama Nuclear Safety Inspectors Office
  Units 1, 2, 3, & 4 <PWR> (In operation), Takahama PS, the Kansai Electric Power Co., Inc

- Shimane Nuclear Safety Inspectors Office
  Units 1 & 2 <BWR> (In operation), Shimane NPS, the Chugoku Electric Power Co., Inc

- Genkai Nuclear Safety Inspectors Office
  Units 1, 2, 3, & 4 <PWR> (In operation), Genkai NPS, Kyushu Electric Power Co., Inc

- Sendai Nuclear Safety Inspectors Office
  Unit 1 & 2 <PWR> (In operation), Sendai NPS, Kyushu Electric Power Co., Inc

- Hamaoka Nuclear Safety Inspectors Office
  Units 1, 2 & 3 <BWR> (In operation), Hamaoka NPS, Chubu Electric Power Co., Inc

- Tsuruga Nuclear Safety Inspectors Office
  Unit 1 & 2 <PWR> (In operation), Tsuruga NPS, the Japan Atomic Power Company
  Units 1, 2 & 3 <PWR> (In operation), Mihama PS, the Kansai Electric Power Co., Inc

- Tokai Nuclear Safety Inspectors Office
  Units 1, 2 & 3 <PWR> (In operation), Tokai PS, the Kansai Electric Power Co., Inc
  Units 1, 2, 3, & 4 <BWR> (In operation), Tokai & Ohara Nuclear Safety Inspectors Office
  <GCR> (Under decommissioning setup), Tokai No. 2 PS
  The Japan Atomic Power Company

- Ikata Nuclear Safety Inspectors Office
  Units 1, 2 & 3 <PWR> (In operation), Ikata PS, Shikoku Electric Power Co., Inc

- Tsuruga Nuclear Safety Inspectors Office
  Unit 1 & 2 <PWR> (In operation), Tsuruga NPS, the Japan Atomic Power Company
  Units 1, 2 & 3 <PWR> (In operation), Mihama PS, the Kansai Electric Power Co., Inc

- Sapporo City
  Tomari City
  Sendai City
  Higashidori City
  Aomori City
  Sagamihara City
  Matsuyama City
  Mito City
  Shizuoka City
  Mito City
  Higashidori City
  Sapporo City
  Sendai City
  Higashidori City
  Aomori City
Article 9 Responsibility of Licensee

Each Contracting Party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licensee meets its responsibility.

The prime responsibility for the safety of a nuclear installation rests with the licensee, while the regulatory body establishes relevant regulation to ensure the public safety and supervises that the licensee complies with the regulation.

The rules for the Reactor Regulation Law clarifies the licensee’s responsibility on quality assurance and maintenance management, while the Electricity Utilities Industry Law clarifies the licensee’s responsibility with the Periodic Licensee’s Check and the Audit of Licensee’s Periodic Check System

9.1 Regulatory Measures for the Licensee to take the Prime Responsibility

The prime responsibility for the safety of a nuclear installation rests with the licensee and the licensee shall comply with the regulatory requirements in each stage from planning through operation, which are stipulated in the Reactor Regulation Law, the Electricity Utilities Industry Law, etc. Those regulatory requirements are described in the Article 7 of this report.

The following activities of the licensee are described in the respective articles of this report;
- Education and Training of Operational Personnel etc. (Article 11),
- Quality Assurance Activities (Article 13)
- Periodic Safety Review (Article 14),
- Aging Management Review (Article 14),
- Emergency Preparedness (Article 16),
- Design and Construction (Article 18) and
- Operation (Article 19)

In addition, in order to ensure safety, not only meeting with these regulatory requirements, the licensees are continuously to make effort for improving the safety and reliability of their nuclear installation by taking the following measures;
- Education and training of operators and maintenance personnel and preparation of effective operation manual,
- Collection, examination and exchange of the information related to the operating experiences, ,
- Study of the state-of-the-art technical insight and implementation of safety research,
- Adoption of operating experience, etc. to design, operation and maintenance,
- Implementation of quality assurance activities and
- Preparation of the accident management, etc.
9.2 Supervision of Licensees by Regulatory Body

The basic mechanism to ensure the safety of nuclear installations is that NISA issues licenses, orders the licensee to bear the prime responsibility for safety and supervises it within the legislative and administrative framework.

The following is an overview of the above mentioned mechanism.

(1) Licensing

The Minister of METI issues a license for the establishment of a nuclear installation after examining that the nuclear installation will not be used except for the peaceful purposes, that there is no potential obstacle for accomplishing the planned development of atomic energy, that technical capability and financial foundations of licensees are sufficient, and that the site, the structure and the equipment of the nuclear installation may not cause any hindrance to the prevention of nuclear emergency. The regulation under the Reactor Regulation Law and the Electricity Utilities Industry Law in each stage from planning through operation is described in section 7.3.

(2) Periodic Licensee's Check and Audit of Licensee's Periodic Check System

In addition to the confirmation by NISA at the Periodic Inspection, licensee’s self-controlled inspection that was carried out voluntarily by licensees has been upgraded to the mandatory "Periodic Licensee's Check" through the amendment of the Electricity Utilities Industry Law in 2003. Accordingly licensees shall inspect the nuclear installations subject to the Technical Standards and confirm the conformity and keep the records of the results. The implementing system of the inspections above is audited by JNES as the "Audit of Licensee's Periodic Check System" and the audit results are reported to NISA. NISA evaluates the audit results and publicizes its conclusion.

(3) Operational Safety Inspection and Nuclear Safety Inspector

NISA conducts “Operational Safety Inspection” periodically based on the Reactor Regulation Law to confirm whether the compliance to the Operational Safety Program is assured. In accordance with the Reactor Regulation Law, NISA stations the Nuclear Safety Inspectors at each nuclear installation, who conducts the Operational Safety Inspection four times a year to confirm the licensee’s compliance with the Operational Safety Program, and addresses incidents if they occur.

(4) Quality Assurance and Maintenance Management Activities

In accordance with the ordinance based on the Reactor Regulation Law, the licensee shall establish quality assurance system and maintenance management system and include them in the Operational Safety Program. NISA confirms the compliance with the Operational Safety
Program through the Operational Safety Inspection.

(5) The Senior Specialist for Nuclear Emergency

In accordance with the Special Law for Nuclear Emergency, NISA stations Senior Specialist for Nuclear Emergency at each site of nuclear installations, who guides and advises the licensee in preparing the Licensee’s Plan for Emergency Preparedness, and conducts duties necessary to prevent nuclear emergency and mitigate the consequence should it occur.

(6) Periodic Safety Review

In accordance with the ministerial order based on the Reactor Regulation Law, licensees shall conduct the Periodic Safety Review for the operating reactor facilities every 10 years.

(7) Aging Management Review

In accordance with the ordinance based on the Reactor Regulation Law, licensees shall perform technical review on aging for the safety-related equipment and structures of nuclear installations and to establish and implement the Ten-Year Maintenance Program in no later than thirty years after the start of commercial operation. NISA reviews the technical evaluation and maintenance program prepared by the licensees.

(8) Accident Management

The licensee prepares an accident management program according to the “Accident Management of Severe Accidents at Power Generating Light Water Reactor Facilities”, a decision by the NSC, 1992 (partly revised by the NSC in 1997), and submits it to NISA for review. NISA reviews and evaluates the technical adequacy of it.

(9) Reports on accidents and failures

In accordance with the Reactor Regulation Law or the Electricity Utilities Industry Law, the licensee shall report to NISA on accidents or failures.

(10) On-site Inspection

NISA conducts on-site inspection, if necessary, at the plants, offices, etc. of licensee or its contractor (welders) in accordance with the Reactor Regulation Law or the Electricity Utilities Industry Law.

(11) Revocation

Judging that the licensee violates regulation, the Minister of METI may take measures of
enforcement such as revocation of the license, suspension of operation, fine, etc., in accordance with the Reactor Regulation Law or the Electricity Utilities Industry Law.

In accordance with the provisions of Article 35 of the Reactor Regulation Law, licensees shall take necessary measures for 1) ensuring safe conditions of the nuclear facilities, 2) maintaining safe operation and 3) the safe transportation, storage and disposal of nuclear fuel materials or materials contaminated with nuclear fuel materials. When the above is violated, the Minister of Economy, Trade and Industry can order suspension of operation of the nuclear facilities. Moreover, in accordance with the provision of Article 39 of the "Electricity Utilities Industry Law", licensees are obliged to meet the technical standards as for electric facilities and when it is violated, the Minister of Economy, Trade and Industry can order the suspension of operation of the electric facilities.

9.3 Communication with Licensees

NISA, for mutually promoting the understanding between NISA and licensees on the policy of regulations, is trying to facilitate the opportunities to exchange opinions based on the transparency.

- In order to build mutual trust with licensees and to make a smooth communication at inspection sites, the "Handbook for Inspectors", which describes the inspector's rules, is distributed to all of NISA inspectors to be carried always with them.

- Licensees, JNES and NISA forms the "Project Team for Operational Improvement of the Inspection System" and is making efforts to make efficient and steady use of the new inspection system.

- The Director General of NISA, presidents of licensees, etc. have opportunities to exchange opinions freely and openly on the safety situation of licensees’ nuclear installation and their future tasks from the viewpoint of quality assurance. Moreover NISA staff visits the nuclear power station, and explains the current trend of safety regulation and the concept behind to the field operators and exchange opinions with them in order to promote the morale among the organizations and people concerned.

- In order to share nuclear related safety information concerning accidents, failures etc. of nuclear installations, "Regular Meeting on Safety Management of Nuclear Power Stations" is held about once every two months as an opportunity for opinion exchange on the safety management among NISA, JNES, electric utilities, the Federation of Electric Power Companies, and Japan Nuclear Technology Institute.
C. General Safety Considerations
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Article 10 Priority to Safety

Each Contracting Party shall take the appropriate steps to ensure that all organizations engaged in activities directly related to nuclear facilities shall establish policies that give due priority to nuclear safety.

The development and utilization of nuclear energy has been promoted giving due priority to safety in accordance with the Atomic Energy Basic Law.

The JCO criticality accident in 1999, etc. showed the importance of moral and education of the employee in the organization, and resulted in the introduction of the Operational Safety Inspection system and the allegation system by the employee.

However, TEPCO falsification issue revealed in August, 2002, showed, again, that negligence of priority to safety among personnel gave rise to organizational falsification, and this led to the renovation of the safety regulation by NISA. In the renovated regulation for organization and management, it has introduced the quality assurance system into the licensee and have established it in the regulation. The inappropriate quality assurance system and maintenance management activities were causes of the Secondary Pipe Rupture Accident at Unit 3 of the Mihama Power Station that occurred in August, 2004, and it was pointed out that the deterioration of the "safety culture" lurked in it’s background. As the quality assurance and maintenance management activity are positioned in the center of the corporate culture and organizational climate concerning the nuclear safety (safety culture), the regulatory body comprehends licensees’ efforts for preventing deterioration of the corporate culture and organizational climate at the periodic safety review, and is promoting their efforts by positively encouraging good practices etc. On the other hand, licensees etc. reported to NISA about the measures to prevent recurrence of about one hundred (100) cases of information falsifications and procedural deficiencies in April 2007, and aiming at ensuring nuclear safety, they strengthened their efforts for systematic improvement in the safety culture and started its enhancement. NISA, receiving the reports, is taking measures relevant to the priority to safety at the licensees.

10.1 Basic Policy for Priority to Safety

Priority to safety is a basic policy in all nuclear energy development and utilization in Japan. Article 2 of the Atomic Energy Basic Law states that priority should be given to ensure safety in all related activities.

Also, Article 1 of the Nuclear Regulation Law states that “this law, in accordance with the Atomic Energy Basic Law, is enacted for the purposes of providing necessary regulations on the establishment and operation of reactors, in order to ensure that the use of atomic energy is limited to peaceful purposes and carried out in a planned manner, and at the same time, to ensure the public safety by preventing the hazards due to these materials and reactors.”
10.2 Efforts for Improvement in Safety Culture

Safety culture in the organization is so vital to ensure the safety of the nuclear installation, that the lack of safety culture there may result in serious consequences.

Each regulatory body and licensee makes diverse efforts to establish safety culture.

(1) Efforts by Nuclear Industry

1) Policies of the whole nuclear industry

Japan Atomic Industrial Forum Inc., consisting of about 480 business operators (electricity utilities, reactor manufacturers etc.) who are engaged in the nuclear business, established a "Charter for Safety by Nuclear Power Industry" in October 2006. The objectives of establishing the “Charter”, and the main text of the “Charter” are described below. The top managements of all organizations are obligated to take necessary measures so that the "Charter" penetrates to the all fronts of each organization, and is practiced positively as a voluntary and continuous effort, and is aimed to the long-term continuation of safety achievement.

Objectives to Establish the "Charter"

Technologies for peaceful use of nuclear energy in Japan is on a globally high level, but accidents and troubles which have occurred in the nuclear industry have affected the social confidence of the nuclear power industry. In order to be trusted by society with public confidence it is required of every person engaged in the nuclear industry to have a sense of pride and a sense of responsibility, to raise the consciousness of "not causing any accident by any means", and to establish the safety by taking action. The "Charter" is established as an action agenda accordingly.

Main Text of the "Charter"

Article 1
We have a sense of responsibility and an awareness of its duty, we give the priority to ensuring safety over all, no matter what it may be in what status,

Article 2
We aim at thoroughness of safety measures by learning modesty from past faults and sharing safety information.

Article 3
We make effort to develop good working environments, where matters perceived to be unsafe can be discussed at any time, are produced.

Article 4
We always keep a "questioning attitude", without being self-conceited with good safety
achievements.

Article 5
We positively release error information as well as we listen sincerely to the voice of society.

In addition, although the Charter is conducted by each member's independent effort, the Japan Atomic Industrial Forum Inc. has performed activities to promote the establishment of the Charter by the visiting local governments by the President, visiting members' offices to purport explanation, the presentation of each member's independent efforts at the member's liaison councils, etc.

On the other hand, in April 2005, the nuclear industry (including nuclear power operators, nuclear fuel fabrication facility operators, plant manufacturers, etc.) established the Japan Nuclear Technology Institute (JANTI), who inherits and enhances the functions of the network of organizations for sharing and in the improvement of the safety culture, "Nuclear Safety Network (NS Net)” and the Nuclear Information Center of Central Research Institute of Electric Power Industry and it has new additional functions to study and develop standards and codes, aiming at further improvement in the self-controlled operational safety activity of the nuclear industry. The activities concerning the improvement in the safety culture of this association is as follows;

a. Safety-culture dissemination activities

- Holding seminars concerning safety and lecture meetings, opinion exchange meetings concerning safety for persons at licensees' sites. Moreover, the activities are opened to the public for transparency.
- Investigating and studying trends of safety culture in and outside Japan, and planning to support the licensees' self-controlled activities for safety culture.

b. Peer-review activities

- Cooperating with the Institute of Nuclear Power Operation (INPO) who has abundant peer-review achievements in the U.S. and the World Association of Nuclear Operators (WANO) who is developing the international peer review. It has been enhanced from the conventional review of just confirming documents to the review of focusing on field activities. Moreover, making effort to obtain good foreign practices and making an international contribution, by dispatching personnel to the peer reviews of WANO and the IAEA.
- Disclosing peer-review results, aiming at the formation of social consensus.

c. Effective utilization of information

Utilizing the open library "NUCIA" on nuclear power generation and overseas information, JANTI analyses and evaluates the information and provides the results to
the licensees at the periodically held "Study Group on Operational Information" and at peer reviews. Licensees are supporting INPO, WANO etc. in exchange of operational experience information with overseas as well.

d. Safety-culture assessment activities

Based on the efforts of fostering the safety-culture by the former NS Net, the status of the safety culture of member's sites will be, on a basis of questionnaires, assessed by JANTI as the third party, to support the self-controlled activities for fostering member's safety-culture. These assessment activities will start in the 2007 fiscal year as a trial and will be applied in a practical way in the 2008 fiscal year.

2) Policies of Licensees

All licensees have declared their principles to give due priority to nuclear safety at nuclear installations, and have tried hard to improve not only in the safety culture but also the corporate ethics or quality assurance. Under the policy to give priority to safety, each licensee started system development so that the top management (president) participates in ensuring safety under his direct responsibility.

But in July, 2006, NISA judged that the quality assurance system might not be functioning sufficiently at Tohoku Electric Power Co., Inc., and directed the company to perform the integrated check of the quality assurance system (refer to Section 13.2). Moreover, after discovering data falsification at a hydroelectric power plant of the Chugoku Electric Power Co., Inc. in October 2006, investigation at sections including thermal power and nuclear power was conducted, and of 316 cases in total, 98 cases of falsifications and procedural deficiencies at the nuclear power sections, were discovered. (Refer to Section 6.2)

The causes were judged by the companies that efforts till then by the electric power companies, who are licensees, were not pervading thoroughly to the job sites, and the support by top managements and managers were insufficient to lighten a burden of site stuff. After discussing about the prevention of recurrence at the "Reliability Recovery Committee" of the Federation of Electric Power Companies in March 2007, the electric power companies, reexamined the action agenda of the Federation, and in May of the same year, presented an action plan for prevention of recurrence to NISA, which includes participation of the top management, thoroughness of training and education of personnel, enhancement of sharing safety information, and this started the reconstruction and fixing of the safety culture.

(2) Effort of the National Government

Although the safety culture should be developed in organizations of licensees, who take the primary responsibility in the safety operation of nuclear installations, the national government has appropriate attention on licensees' fostering safety culture and promoting it.
1) Efforts of NISA

As it is important for a manager of an organization to pervade a sense of value by giving top priority to safety among site staff, regulatory bodies are required to look at the nature of the licensee’s management and promotion of safety culture. The regulatory bodies are encouraging the licensee's managements so as to make them incorporate the quality management system and safety culture, for the time being, and they are requiring licensees to follow their quality management systems strictly. As part of this activity, NISA is designing institutional arrangements to clarify regulatory requirements concerning the quality assurance so that the licensee's quality assurance system is established firmly. The establishment of the quality assurance system is described in Article 13.

NISA together with JNES is, in order to promote the licensee's safety culture, taking the following measures:

- Development of the quality assurance system

  From October 2003, the licensee's quality assurance system is provided in the Operational Safety Program, and it is verified during the Operational Safety Inspection etc. that the quality assurance activities are functioning properly. Refer to the Article 13

- Deterioration prevention of the corporate culture and organizational climate

  Since the corporate culture and organization culture are fundamentals of various activities for ensuring safety, licensees are taking measures for deterioration prevention and the performing of the self-assessment at the periodic safety review. NISA perceives the licensees' efforts during the periodic safety review and is promoting their efforts by positively encouraging good practices as follows.

  a) Viewpoints

     NISA perceives the licensee's efforts from the following viewpoints.

     (i) Effectiveness of the efforts for detection and prevention of organization climate deterioration
     (ii) Self or external assessment on the effectiveness of the efforts for detection and prevention of organization climate deterioration

  b) Encouragement

     (i) Especially effective efforts for detection and prevention of organization climate deterioration
     (ii) Especially effective efforts to enrich measures for aging management in the organizational climate. The viewpoints to be used to perceive efforts developed
by JNES are provided in Table 10-1.

- **Evaluation of safety culture**

NISA together with JNES is developing a guideline to assess the licensee's safety culture at the Operational Safety Inspection. In the development of this guideline, IAEA's publication (INSAG-4 "Safety Culture", "ASCOT Guideline", etc.), ISO 9001 (2000) and foreign examples are referred to.

*Note: ASCOT: Assessment of Safety Culture in Organizations Team*

- **Root cause analysis of accidents and failures**

When an accident or a failure occurs, it is necessary to clarify not only the direct causes, but also the root causes taking account of their organizational factors. Licensees are required to implement systematic and lasting measures. From the viewpoint of making licensee's root cause analyses effectual, a guideline for root cause analysis is being prepared in the system of the quality assurance standards of Japan Electric Association. NISA together with JNES is developing a guideline to assess effectiveness of the licensee's root cause analysis.

- **Comprehensive check of power generation facilities**

Based on the comprehensive check (refer to Section 6.2) of power generation facilities, NISA decided to take measures for licensees to give due priority to safety furthermore. These matters will be reflected in related legislations, etc.

(i) **Clarification of a compliance system in the Operational Safety Program**

The following will be added as matters to be provided in the Operational Safety Program.

- Matters relating to the compliance system,
- Matters relating to the system for fostering safety culture,
- Matters relating to the root cause analysis, and
- Matters relating to the information reporting important-to-safety.

(ii) **Addition of measures for Safe Operation**

- To develop work procedures properly and to perform operational safety activities following the procedures, and
- To take actions for the required procurement control in order to be able to share manufacturer's information about safety technologies among licensees.

(iii) **Development of an organizational system in which independency of the Chief Engineer of Reactors is secured**

2) **Efforts of the NSC**
**First-Series Roundtable Discussions on Safety Culture**

The NSC, as one of measures taken after the JCO nuclear criticality accident occurred in September 1999, held the "First-Series Roundtable Discussions on Safety Culture" with unit managers and shift supervisors of twenty one (21) nuclear facilities in Japan from July 2001 to December 2003. The contents were compiled and published in a document "Site interviews about Safety Culture –Discussions on sites where the safety should be assured -" (January 2004). The summary is as follows:

(a) Findings brought from the sites for developing safety culture
   a. Educate the staff to have their own pride and responsibility without hiding in an organization.
   b. Educate the staff to develop common sense and morals so that they can recognize the necessity of safety by their own values.
   c. Mistakes are not for learning about people’s faults. Mistakes are lessons for preventing problems from occurring again and for assuring safety. It is necessary to recommend staff members to report mistakes and managers should not punish them for it.
   d. Learning does not always consist of sitting and learning. There is actual experience and learning by simulation.
   e. You can find opportunities everywhere on-site for systematic training, lessons for preventing problems from reoccurring, and for other things.
   f. Successful experiences do expire. Do not adopt everything at once. Be sure to confirm and consider them since some successful experiences may be out of date.
   g. Introduce knowledge in quality control and other areas to business management.
   h. Be sure to cope with all circumstances, imagine every possible situation and make it clear who is responsible for making the decisions.
   i. There is no purpose in collecting information alone. It is more important who collects it and how it is used.
   j. Learn to see yourself and your organization from a broad point of view.

(b) Important topics brought from the sites regarding safety culture
   a. Educate every staff member to comply with the corporate morals.
   b. Use adverse circumstances and pressures (You can keep tension by the strict gaze of the surrounding society).
   c. Communicate more with the media than usual and proceed with transparency of information.
   d. Educate every staff member to be accustomed to being conscious of the complete
flow as a whole.
e. Let them realize that reporting and consulting are the best steps for assuring safety.
f. Introduce engineer morals and morals for work accomplishment into education and training programs.
g. Educate all staff members to have a questioning attitude about the safety of their work, actions, and activities.
h. Make the most use of knowledge in the general analysis system that supports the passing on technology and the high technologies that explain vagueness.
i. Always appreciate the appropriate allocation of human resources. (Top management)
j. Reinforce the quality assurance system and concentrate on software quality assurance.
k. Maintain and improve the ability of the staff in accordance with the increase rate of direct constructions.
l. Sharing the values of safety with cooperating companies is a major key for developing safety culture.
m. Use the latest knowledge about risk communication to communicate with outside stake-holders.
n. It is necessary to observe our actions both from the subjective and objective viewpoints and to ask ourselves if they are appropriate.

- Second-Series Roundtable Discussions on Safety Culture

The NSC held a series of “Roundtable Discussions on Safety Culture”, from October 2004 to April 2005, as one of the measures after the secondary pipe rupture accident at Unit 3 of the Mihama Power Station that occurred in August 2004, in order to exchange opinions with top managers of nuclear power companies and major contractors. The contents were compiled and published in a document "Fostering a Culture of Safety in Japan’s Nuclear Industry – Exchange of Views with Top Management" (June 2005), The summary is as follows.

(a) Management Safety Alertness and Activities

To conduct activities of nuclear energy, everybody in the organization must share and implement the practices of valuing the concept of “safety first”, by constantly questioning whether the current practices of activities are appropriate from the viewpoint of ensuring safety. To this end, the top management should take leadership in such areas as organizational composition, resource allocation, quality assurance system, technology, human resources and training.
(b) Productive Communications between Site Staff and Upper Management

To give safety-ensuring activities substantial significance, it is crucial that safety-related information smoothly permeates throughout the organization, and that a system and means be provided to enable it. With full awareness of the difficulties involved in creating smooth communications, management must constantly and intentionally motivate their staff to improve the situation by ensuring the bi-directional information channels, and appropriate and timely remedial actions.

(c) Workplace Environment

Regulators and licensees must continue to make bilateral efforts to improve the effectiveness of regulatory activities for productively improving safety assurance, without being content with the formalities in meeting regulatory standards in effect. It is necessary that the management of licensees and contractors will maintain and promote a thoroughgoing cooperative relationship, while sharing a strong perception that ensuring safety is the prerequisite to everything else in nuclear activities, and that it be the most efficient means of cost optimization.
### Table 10-1 Viewpoints to Comprehend the Efforts to Prevent Deterioration of Licensees’ Organizational Climate

<table>
<thead>
<tr>
<th>Points to confirm symptoms of the organizational climate deterioration</th>
<th>Viewpoints of Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Top management's commitment</td>
<td>Pervasion of messages for priority to safety to the tips of organization.</td>
</tr>
<tr>
<td>2. Senior management's clear policies and behavior</td>
<td>Presentation and behavior of the policies of ensuring safety</td>
</tr>
<tr>
<td>3. Improvement and fixing of the quality management system (QMS)</td>
<td>Feedback of the knowledge obtained from the nonconformity management to QMS improvement</td>
</tr>
<tr>
<td>4. Reporting culture</td>
<td>System, encouragement and utilization of reporting</td>
</tr>
<tr>
<td>5. Learning organization</td>
<td>Operating experience feedback, efforts of maintaining and improving technical capabilities, communication in the operational safety activities</td>
</tr>
<tr>
<td>6. Workplace with good communication</td>
<td>Efforts to improve in-company communication, communication with contractors</td>
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<tr>
<td>7. Exclusion of decision-making by a misjudgment</td>
<td>Preventive measures for eliminating a decision-making by a misjudgment</td>
</tr>
<tr>
<td>8. Compliance with rules</td>
<td>Maintenance and management of rules, fixing of routine work</td>
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<tr>
<td>9. Accountability and transparency</td>
<td>Timely information service, promotion of mutual understanding among local residents and regulatory bodies, improvement in transparency</td>
</tr>
<tr>
<td>10. Self (or 3rd party) assessment</td>
<td>The self-assessment (the 3rd party) method for preventing activities to be just a formality</td>
</tr>
</tbody>
</table>
Article 11 Financial and Human Resources

1. Each Contracting Party shall take the appropriate steps to ensure that adequate financial resources are available to support the safety of each nuclear facility throughout its life.

2. Each Contracting Party shall take the appropriate steps to ensure that sufficient numbers of qualified staff with appropriate education, training and retraining are available for all safety-related activities in or for each nuclear facility, throughout its life.

The financial basis of electricity utility rests on the understanding and recognition that nuclear energy is the environmentally clean energy and reliable source for base load power, under the pressure of reduction of power rate due to the deregulation of electricity utility industry.

In Japan the sufficient numbers of qualified staff are available through imposing requirements of appointment of chief reactor engineers, persons responsible for operation, chief electrical engineers, etc. upon licensees and assessing the technical competence of the licensees. After more than 30 years of operational experiences, many experienced employees are now retiring. The licensees face the challenge of succession of technology and ensuring human resources. The recruitment and training of personnel in various fields are now in progress.

11.1 Financial Resources of the Licensee

(1) Confirmation at Issuing License

Before issuing license of a nuclear installation, the Minister of METI, in accordance with Article 24 (Criteria for the license) of the Reactor Regulation Law, confirms that the applicant for the license possesses necessary financial basis by requiring the applicant to submit “Amount of Funds Required for Construction and Finance Procurement Plan”, and also consults with the AEC. (Refer to section 7.3 and Fig. 7-3)

(2) Applicant for the License of Nuclear Installations

Applicants for license of commercial power reactors are the general electric utilities, that is, 9 electric power companies and 2 wholesale electric power companies. The Minister of METI issues license for electricity utility business only to those meeting certain criteria of financial basis, technical capability, etc.

The nuclear power generation is recognized as a superior power source with characteristics of reliable supply and useful energy to cope with global warming, and measures, such as performing a preferential load dispatching, are taken. Such utilization of the nuclear energy ensures stable flow of income for electric utilities.
On the one hand, since back end businesses, such as reprocessing of spent fuel generated by nuclear power generation, requires large amount of expense over extremely long period of time, in accordance with the "Law for Reserving and Management of Reserve Funds for Reprocessing Spent Fuel in Nuclear Power Generation, etc." enacted in 2005, the electric utilities reserve funds for the expense in advance. As for final disposal of high level radioactive wastes, the Nuclear Waste Management Organization of Japan, an implementing organization for disposal, will perform geological disposal in accordance with the Law concerning Final Disposal of Specific Radioactive Waste enacted in 2000, using funds reserved by electric utilities etc. Furthermore, METI enacted the Ministerial order of Reserve Fund for Dismantling Nuclear Power Facilities in accordance with provision of Article 35 of the Electricity Utilities Industry Law, and the electric utilities deposit reserves for decommissioning on the basis of this order.

On the other hand, the Japan Atomic Energy Agency, who owns R&D reactors of Monju and Fugen, is established by a law, and financial basis necessary for its business operation is provided by the national budget.

11.2 Human Resources concerning the Nuclear Installation of the Licensee

(1) Confirmation of Technical Competence

Before issuing license of a nuclear installation, the Minister of METI confirms that the applicant possesses technical competence necessary to establish a nuclear installation and operate it adequately, and consults with the Nuclear Safety Commission (the NSC). The NSC had established the “Regulatory Guide for Reviewing Technical Competence of Nuclear Operators” on May, 2004, and based on this examination guide, the applicant's technical competence for the following items is examined.

The examination items of technical competence;
1. Organization for design and construction,
2. Ensuring engineers for design and construction,
3. Experience related to design and construction,
4. Quality assurance activities concerning design and construction,
5. Organization for operation and maintenance,
6. Ensuring engineers for operation and maintenance,
7. Experience related to operation and maintenance,
8. Quality assurance activities concerning operation and maintenance,
9. Education and training for engineers,
10. Designation and staffing of qualified personnel etc.

The licensees are responsible for safety of the decommissioning and for preparing personnel for it. In fact, the licensees have trained and prepared human resources and implemented technological development programs through the decommissioning and verification test on a research reactor (JPDR) in cooperation with national organizations, manufacturers and construction companies, and implemented decommissioning for the Tokai Power Station of the
(2) Qualification, Training and Retraining of Personnel Engaged in Safety Activities

1) Staff Qualification

The licensees shall appoint a Chief Reactor Engineer to supervise safety operation of nuclear installation, a Chief Electrical Engineer and a Chief Engineer of Boiler and Turbine to supervise safety during construction, operation and maintenance of electric facilities. The licensee assigns the Persons Responsible for Operation from those who have knowledge, skills, and experience required for operation of reactors, and who satisfy requirements provided by the Minister of METI. As a method to judge conformity to requirements of a person responsible for operation, it is under study to incorporate an accreditation system utilizing an independent organization. The person responsible for operation observes operation in general and supervises operators. The numbers of Chief Engineers of Reactors and Persons Responsible for Operation are 1254 and 421 respectively at the end of June, 2007.

Their duties are explained in Section 19.3 in detail.

As for the qualification of staff engaged in the dimensional measurement of defect in the fitness-for-service assessment of equipment, PD (performance demonstration) qualification system for the ultrasonic flaw detection system (including the qualification of staff) is employed by the Japanese Society for Non-Destructive Inspection, and 14 PD technicians are certified (as of November 2006).

2) Staff Training and Retraining and Resources for Training

Licensees shall integrate education on operational safety of personnel in charge of operation and management of a nuclear installation into the Operational Safety Program, and prepare and carry out long-term and short-term staff training programs to maintain and improve their skills and capabilities. Licensees, in addition to in-house operator training course using simulators (Table 11-1); periodically send their operators to external operation training centers for retraining. There are two centers: the BWR Operation Training Center (BTC) for BWRs and the Nuclear Power Training Center (NTC) for PWRs. A curriculum suitable for the ability/skill of each operator is prepared in these training centers.

Each licensee has established maintenance training centers (Table 11-2) for education and training of maintenance personnel. Various mock-up devices, inspection devices and training devices, etc, simulating plant facilities for training purposes, have been used to maintain and improve the knowledge, skills and work management capabilities of personnel involved in maintenance and inspection.
11.3 Efforts for Ensuring Infrastructure of Human Resources in the Regulatory Bodies

(1) Training of Experts in NISA

Staff members, who are in charge of nuclear regulation in the Nuclear and Industrial Safety Agency (NISA), are the Senior Specialist for Nuclear Emergency, the Nuclear Safety Inspector, the Nuclear Facility Inspector, the Electric Facilities Inspector, and the Safety Examiner. These are called "Nuclear Regulatory Staff" as shown below.

A Senior Specialist for Nuclear Emergency is stationed at each nuclear installation, guides and advises the licensees in preparing its Plan for Emergency Preparedness, and conducts duties necessary to prevent progression of nuclear emergency should it occur.

A Nuclear Safety Inspector is stationed at each nuclear installation, conducts the Nuclear Safety Inspection to confirm licensee’s compliance with the Operational Safety Program, address incidents if they occur, and supervises operation management of a nuclear installation.

A Nuclear Facility Inspector and/or an Electric Facilities Inspector is dispatched from NISA head office, and conducts inspection activities, such as the Pre-Service Inspection and the Periodic Inspection of a nuclear installation, and the Fuel Assembly Inspection, on the basis of the Reactor Regulation Law or the Electricity Utilities Industry Law, respectively.

Safety Examiners conduct the Safety Examination of a nuclear installation.

A Nuclear Regulatory Staff is required to have expertise in nuclear technology. The system of long term and multistage education and training programs necessary for improvement of his/her expertise is developed, taking account of his/her experience and of the nature of the facility to which he/she is assigned. Moreover, NISA started a Special Training Course on Quality Assurance of Nuclear Installation in 2002.

In order to increase effectiveness of the training, the contents of the training being implemented are also reviewed and improved suitably. The disposition of the personnel engaged in securing safety of nuclear installations is improved through these training. Summary of training for nuclear safety regulation is shown in Fig. 11-1.

NISA has appointed six Special Inspection Instructors in December 2003. They advise inspectors for the Nuclear Safety Inspection, the Periodic Inspection, etc. in each power station, instruct them to equalize the levels of inspections, and collect opinions and proposals from inspectors and licensees for the purpose of opinion exchanges at the site.

Furthermore, NISA maintains and develops its regulatory capability, as well as contributes to international safety regulation, through exchange of technical experts and information on safety regulation and safety technology, under bilateral arrangements with foreign regulatory bodies and in the framework of multilateral cooperation (the IAEA and the OECD/NEA).

Moreover, besides training professional human resources as mentioned above, NISA recruits