

## II. Overview of Nuclear Safety Regulations and Other Regulatory Framework in Japan before the Accident

This Chapter provides an overview of the legislative and regulatory framework for nuclear safety and nuclear emergency preparedness and responses.

### 1. Legislative and regulatory framework for nuclear safety

#### (1) Main laws and regulations

In the legislative framework for nuclear safety in Japan, in respect of the standards of IAEA, under the Atomic Energy Basic Act (Act No. 186 of 1955), which is at the top of the framework and defines basic philosophy for utilization of nuclear energy, the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Act No. 166 of 1957; hereinafter referred to as the “Reactor Regulation Act”) which provides for safety regulation by the Government and obligations of the operators, the Law for Prevention of Radiation Hazards due to Radioisotopes, etc., the Electricity Business Act, and the Act on Special Measures Concerning Nuclear Emergency, among others, have been put in place (Figure II-1-1). Other than these, the Nuclear Safety Commission (hereinafter referred to as “the NSC Japan”) developed the guidelines to be used in the evaluation of the safety review and assessment conducted by the regulatory authority. These guidelines are also used when the regulatory authority conducts safety review and assessment, for the efficiency and facilitation of safety reviews and assessment by the Government (Table II-1-1).

As for dose limits, etc. for occupational exposure, etc., pursuant to the Law for Technical Standards of Radiation Hazards Prevention (Act No. 162 of 1958), the Radiation Review Council established in the Ministry of Education, Culture, Sports, Science and Technology (hereinafter referred to as “MEXT”) is to discuss the introduction to Japan of the International Commission on Radiological Protection (ICRP)’s recommendations and to state its views on the policy of relevant Ministries and Agencies on the adoption of the recommendations. Furthermore, if technical standards concerning the prevention of radiation hazards provided for in the laws and regulations such as dose limits to radiation workers are to be established, the government agency having jurisdiction of the laws and regulations in question must consult the Radiation Review Council established in MEXT.

#### 1) The Atomic Energy Basic Act

The Atomic Energy Basic Act prescribes the basic policy of the utilization of nuclear energy as follows: “the research, development and utilization of nuclear energy shall be limited to peaceful purposes, shall aim at ensuring safety, And shall be performed independently under democratic administration, and the results obtained shall be made public so as to actively contribute to international cooperation. ”

## 2) The Reactor Regulation Act

The Reactor Regulation Act stipulates, for commercial power reactors, the procedures for safety regulation and the licensing criteria for the permission of establishment of a reactor, approval of operational safety regulations, Operational Safety Inspection and decommissioning of a reactor, among others, as regulations necessary for the establishment and operation of a reactor. The act also provides for dispositions such as suspension of operation and license revocation and criminal punishment including imprisonment and fine.

The Ministerial Ordinances and other regulations established under the Reactor Regulation Act are the “Rules for Commercial Nuclear Power Reactors concerning the Installation, Operation, etc.” (Reference 2-1-2) and the “Notice on Dose Limits” (Reference 2-1-2).

## 3) The Electricity Business Act

The Electricity Business Act, which is applied not only to nuclear power generation but also to thermal and hydraulic power generation, is an act that comprehensively regulates the electricity business in Japan, and provides for the procedures for safety regulation including approval of design and construction method, pre-service inspection and facility periodic inspection for commercial power reactors.

The Ministerial Ordinances and other regulations which are established under the Electricity Business Act and are related with the safety regulation of nuclear installation are the Rules for the Electricity Business (Reference 2-1-3), the Ordinance of Establishing Technical Requirements for Nuclear Power Generation” (Reference 2-1-4), the Ordinance of Establishing Technical Requirements on Nuclear Fuel Material for Power Generation (Reference 2-1-5) and the Technical Requirements on Dose Equivalent, etc. due to Radiation Relating to Nuclear Power Generation Equipment (Reference 2-1-6).

## (2) Licensing system

### 1) Licensing system

- a. In establishing a commercial nuclear reactor, one must receive a license by the Minister of Economy, Trade and Industry in accordance with the provisions of the Reactor Regulation Act. When the Minister of Economy, Trade and Industry grants a license, he/she must hear the views of the NSC Japan on the technical competence of establishing and correctly implementing the operation of a reactor, and on whether there is no problem in reactor's emergency response.
- b. A person who has obtained the license for reactor establishment (hereinafter referred to as the "licensee of reactor operation") must obtain an approval from the Minister of Economy, Trade and Industry on the construction plan prior to construction based on the provisions of the Electricity Business Act.
- c. Regarding the fuel assembly to be loaded into the reactor, its design must be approved by the Minister of Economy, Trade and Industry based on the provisions of the Electricity Business Act.

### 2) Inspection system

- a. In construction of a nuclear facility, the licensee of reactor operation must undergo and pass the pre-service inspection, which is conducted for each construction process by the Minister of Economy, Trade and Industry, based on the provisions of the Electricity Business Act.
- b. The fuel assembly to be loaded into the reactor must undergo and pass the fuel assembly inspection conducted by the Minister of Economy, Trade and Industry, based on the provisions of the Electricity Business Act.
- c. After commissioning, the licensee of reactor operation must undergo the periodic inspection conducted by the Minister of Economy, Trade and Industry on the pre-determined components that are important in terms of safety.
- d. As to the operational safety of the operating facilities, the licensee of reactor operation

must undergo the Operational Safety Inspection conducted by Nuclear Safety Inspector of the Nuclear and Industrial Safety Agency (hereinafter referred to as “NISA”), relegated by the Minister of Economy, Trade and Industry.

- e. As for inspection on physical protection, the compliance inspection of physical protection program is conducted in accordance with the provisions of the Reactor Regulation Act,

### (3) Government Institutions

The Minister of Economy, Trade and Industry (hereinafter referred to as “METI”) has jurisdiction over nuclear power reactor facility in Japan, and the Law for Establishment of the Ministry of Economy, Trade and Industry clearly stipulates that NISA is the “organization to ensure the safety of nuclear energy,” and it is positioned as a special organization of the Agency for Natural Resources and Energy of METI. NISA has definitive authorities and functions for the safety regulation based on the provisions of the Reactor Regulation Act and the Electricity Business Act. On the other hand,

In concrete terms, the Minister of Economy, Trade and Industry is responsible for the regulatory activities over the nuclear installation such as the license for reactor installment pursuant to the Reactor Regulation Act, and the approval of construction plan and pre-service inspection pursuant to the Electricity Business Act. The Minister of Economy, Trade and Industry relegates these regulatory activities to NISA, which independently makes decisions or may consult its proposed decision with the Minister of Economy, Trade and Industry without involvement of the Agency for Natural Resources and Energy.

The NSC Japan is an organization established under the Cabinet Office, independent from the ministries and agencies involved in the utilization of nuclear power. It supervises and audits the safety regulation implemented by the regulatory bodies from the independent perspective and has the authorities to make recommendations to the regulatory bodies through the Prime Minister, if necessary. Moreover, NISA established the Japan Nuclear Energy Safety Organization (hereinafter referred to as “JNES”) as their technical support organization in October, 2003. JNES conducts a part of inspection of nuclear facilities pursuant to the laws, and provides technical support to the safety review and assessment on the nuclear installations and the consolidation of the safety regulation standard conducted by NISA (Figure II-1-2).

The emergency monitoring is supposed to be carried out by the local governments in the

current Nuclear Emergency Preparedness system, and MEXT is supposed to support the local governments' emergency monitoring activities by mobilizing the emergency monitoring members and devices to dispatch to the site, with the cooperation by the designated public organizations (National Institute of Radiological Sciences and Japan Atomic Energy Agency), etc.

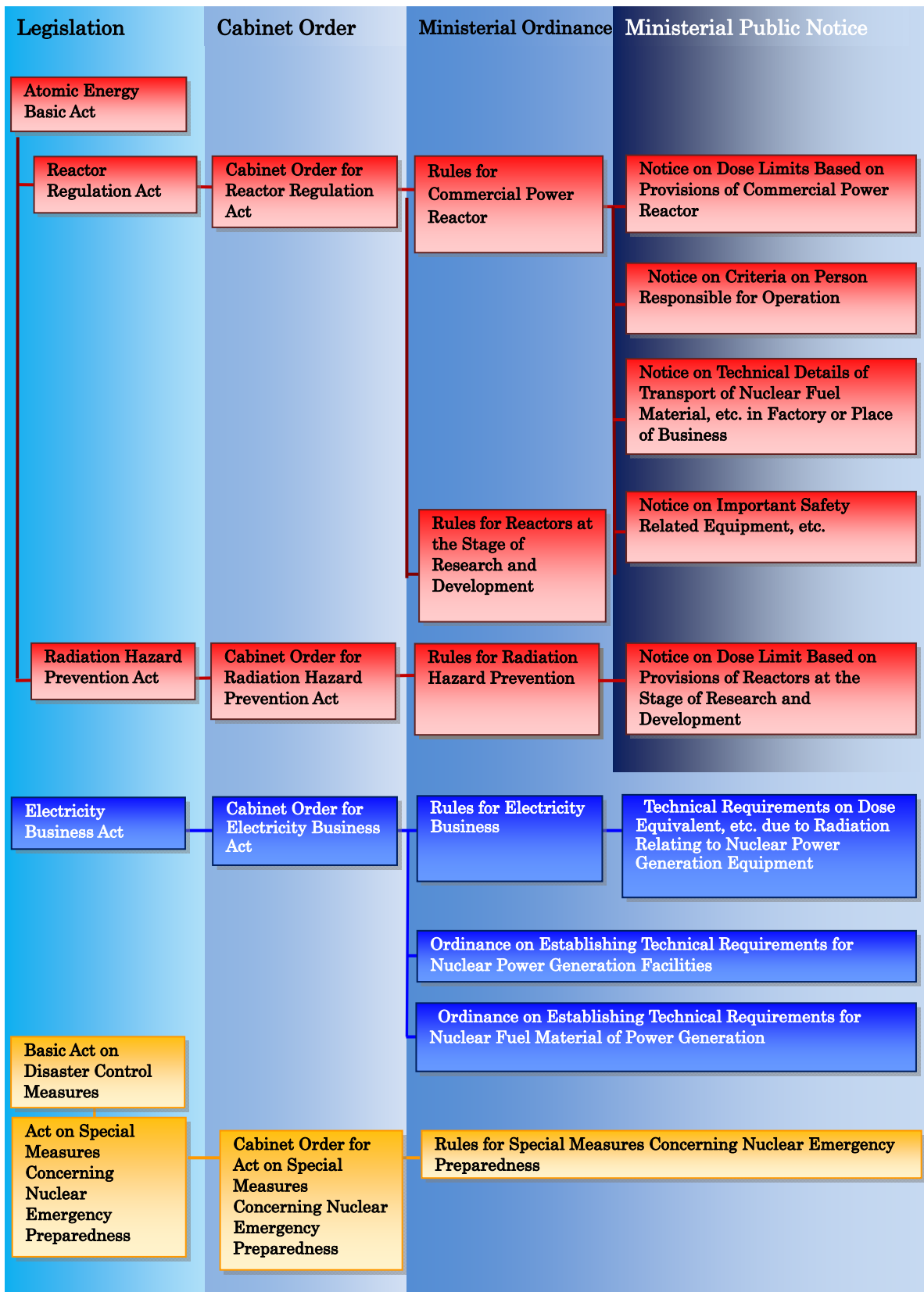


Figure II-1-1 Main Legal Structure of Safety of Nuclear Reactor Facilities in Japan

<b>Hazards Prevent</b>	<b>Siting</b>	Regulatory Guide for Reviewing Nuclear Reactor Site Evaluation and Application Criteria
	<b>Design</b>	Regulatory Guide for Reviewing Safety Design of Light Water Nuclear Power Reactor Facilities
		Regulatory Guide for Reviewing Classification of Importance of Safety Functions of Light Water Nuclear Power Reactor Facilities
		Regulatory Guide for Reviewing Seismic Design of Nuclear Power Reactor Facilities
		Regulatory Guide for Reviewing Fire Protection of Light Water Nuclear Power Reactor Facilities
		Regulatory Guide for Reviewing Radiation Monitoring in Accidents of Light Water Nuclear Power Reactor Facilities
		Fundamental Policy to be Considered in Reviewing of Liquid Radioactive Waste Treatment Facilities
		Regulatory Guide for Evaluating Safety Assessment of Light Water Reactor Facilities
	<b>Safety Evaluation</b>	Regulatory Guide for Evaluating Core Thermal Design of Pressurized Water Cooled Nuclear Power Reactors
		Regulatory Guide for Evaluating Emergency Core Cooling System Performance of Light Water Power Reactors
		Regulatory Guide for Evaluating Reactivity Insertion Events of Light Water Nuclear Power Reactor Facilities
		Regulatory Guide for Evaluating Dynamic Loads on BWR MARK-I Containment Pressure Suppression Systems
		Regulatory Guide for Evaluating Dynamic Loads on BWR MARK-II Containment Pressure Suppression Systems
		Regulatory Guide for Meteorological Observation for Safety Analysis of Nuclear Power Reactor Facilities
		<b>Dose Target</b>
	Regulatory Guide for Reviewing Evaluation of Dose Target for Surrounding Area of Light Water Nuclear Reactor Facilities	
Guide for Radiation Monitoring of Effluent Released from Light Water Nuclear Power Reactor Facilities		
<b>Technical Competence</b>	Regulatory Guide for Examining Technical Competence of License Holder of Nuclear Power	

Table II-1-1 Major Regulatory Guides Specified by the NSC Japan for Power Generating Light Water Reactors

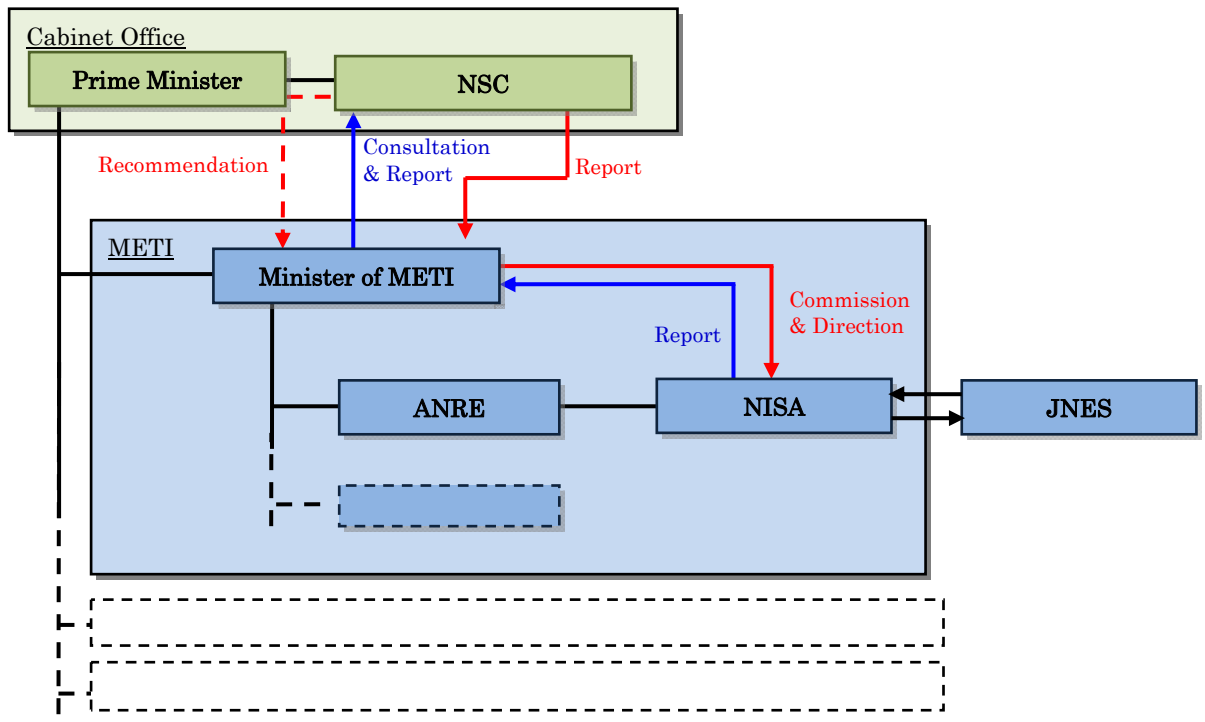


Figure II-1-2 Position of NISA in the Government

## 2. Mechanism for nuclear emergency responses

### (1) The Act on Special Measures Concerning Nuclear Emergency Preparedness

The Nuclear Emergency Preparedness Act (hereafter referred to as “the Nuclear Emergency Preparedness Act”) was established after the criticality accident which occurred at JCO nuclear fuel fabrication facilities in 1999, and stipulates the licensees’ duties on prevention of nuclear disaster, declaration of the Nuclear Emergency and establishment of the Nuclear Emergency Response Headquarters (hereinafter referred to as “NERHQs”), implementation of emergency response measures, measures for restoration from nuclear emergencies, etc.

The Basic Plan for Emergency Preparedness, containing the Basic Act on Disaster Control Measures, forms the basis of the nuclear emergency response and states the measures to prevent occurrence and expansion of nuclear disaster and restore the nuclear disaster. In addition, the Basic Plan for Emergency Preparedness states that the “Regulatory Guide: Emergency Preparedness for Nuclear Facilities”, the prevention guide established by the NSC Japan, shall be fully taken into consideration for technical and special matters (Attachment II).



## (2) Nuclear emergency

In a nuclear emergency, closely coordinated response among relevant organizations shall be performed based on the Nuclear Emergency Preparedness Act, and in an emergency at nuclear power reactor facilities, the following responses shall be taken.

- 1) The licensee of reactor operation shall immediately report to the Minister of Economy, Trade and Industry and heads of local governments when an event stipulated in Article 10 of the Nuclear Emergency Preparedness Act (Specific Event) occurs (Figure II-2-1).
- 2) The Minister of Economy, Trade and Industry, receiving the notification, shall trigger activities according to the procedure stipulated by law. Staff with expertise in emergency measures shall be sent to local governments on request. The Senior Specialists for Nuclear Emergency Preparedness assigned to work on-site shall collect information and perform duties necessary to smoothly implement the prevention of the expansion of a nuclear disaster.
- 3) When the Minister of Economy, Trade and Industry recognizes that the Specific Event has exceeded the predetermined level and developed into a nuclear emergency situation, the Minister shall immediately report it to the Prime Minister.
- 4) The Prime Minister shall declare “Nuclear Emergency Situation” in response to it and direct relevant local governments to take emergency response measures such as sheltering or evacuation and preventive stable iodine administration.
- 5) The Prime Minister shall establish NERHQs in Tokyo, which he shall head, and the “Nuclear Emergency Response Local Headquarters” hereinafter referred to as “Local NERHQs”, at the concerned Off-Site Center.
- 6) In a nuclear emergency, the NSC Japan shall convene the “Technical Advisory Organization in an Emergency” that is composed of the Commissioners and the Advisors for Emergency Response and shall give technical advice to the Prime Minister.
- 7) Local governments shall establish their own emergency response headquarters.
- 8) In order to share information among the National Government, local governments, and related organizations such as licensees, etc., and, if necessary, to coordinate emergency measures to be implemented by the respective organizations, “the Joint Council for Nuclear Emergency Response” shall be established at the Off-Site Center (Figure II-2-2).

## (3) Nuclear emergency response drill

The purpose of a nuclear emergency response drill is 1) to enhance understanding of, and to

facilitate actions for, nuclear emergency response by the relevant personnel of the National Government, local governments, the licensee, and residents, and 2) to verify whether emergency response measures function as planned, and whether information sharing and cooperation among related organizations are sufficient. The National Government, local governments, designated public organizations and the licensee cooperate and participate in drills, which cover communication, monitoring, decision on emergency measures to be taken, sheltering or evacuation, etc.. In Japan, various forms of drills are performed and a large scale national drill is performed once a year.

Events	Criteria for Specific Event	Criteria for Nuclear Emergency
a) Radiation dose near the site boundary	5 micro Sv/h or more at one point for more than consecutive 10 minutes	500 micro Sv/h or more at one point for more than consecutive 10 minutes
	5 micro Sv/h or more at two or more points simultaneously	500 micro Sv/h or more at two or more points simultaneously
b) Detection of radioactive materials in usual release points such as exhaust pipes	When the concentration of radioactive materials equivalent to 5 micro Sv/h or more continues for 10 minutes or more, or radioactive materials equivalent to 50 micro Sv/h or more are released	When the concentration of radioactive materials equivalent to 500 micro Sv/h or more continues for 10 minutes or more, or radioactive materials equivalent to 5 mSv/h or more are released
c) Detection of radiation or radioactive materials by fire, explosion, etc (outside the control zone)	Radiation dose of 50 micro Sv/h or more	Radiation dose of 5 mSv/h or more
	Release of radioactive materials equivalent to 5 micro Sv/h or more	Release of radioactive materials equivalent to 500 micro Sv/h or more
d) Individual events of each nuclear installation		
Failure of reactor scram	When the nuclear reactor shutdown cannot be performed by usual neutron absorbers	When all reactor shutdown functions are lost in a case where emergency reactor shutdown is necessary
Loss of reactor coolant	When leakage of nuclear reactor coolant occurs, which needs operation of the emergency core coolant system (ECCS)	When water cannot be injected into the nuclear reactor by any ECCS
Loss of all AC power supplies	When power supply from all AC power supplies is failed for 5 minutes or more	When all functions for cooling a reactor are lost with loss of all AC power supplies
Decrease in water level of the spent fuel pool at reprocessing facilities	When water level is decreased to the point where a fuel assembly is exposed	

<ul style="list-style-type: none"> <li>- The competent minister sends staff with expertise on request of local governments.</li> <li>- The resident Senior Specialist for Nuclear Emergency Preparedness carries out necessary work.</li> </ul>	<ul style="list-style-type: none"> <li>- The competent minister reports the nuclear emergency to the Prime Minister after confirming the situation.</li> <li>- The Prime Minister declares “Nuclear Emergency” and takes the following responses:               <ul style="list-style-type: none"> <li>- to lead, advise or direct related local governments on necessary measures such as sheltering or evacuation;</li> <li>- to establish NERHQs and Local NERHQs; and</li> <li>- to establish the Joint Council for Nuclear Emergency Response for information exchange among the National Government and local governments</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>- Related ministries and agencies organize a joint task group in Tokyo on nuclear accident countermeasures.</li> <li>- Related local organizations organize a joint local task group in the Off- Site Center.</li> </ul>	

Figure II-2-1 Specific Event and Nuclear Emergency Provided for in the Act on Special Measures Concerning Nuclear Emergency Preparedness

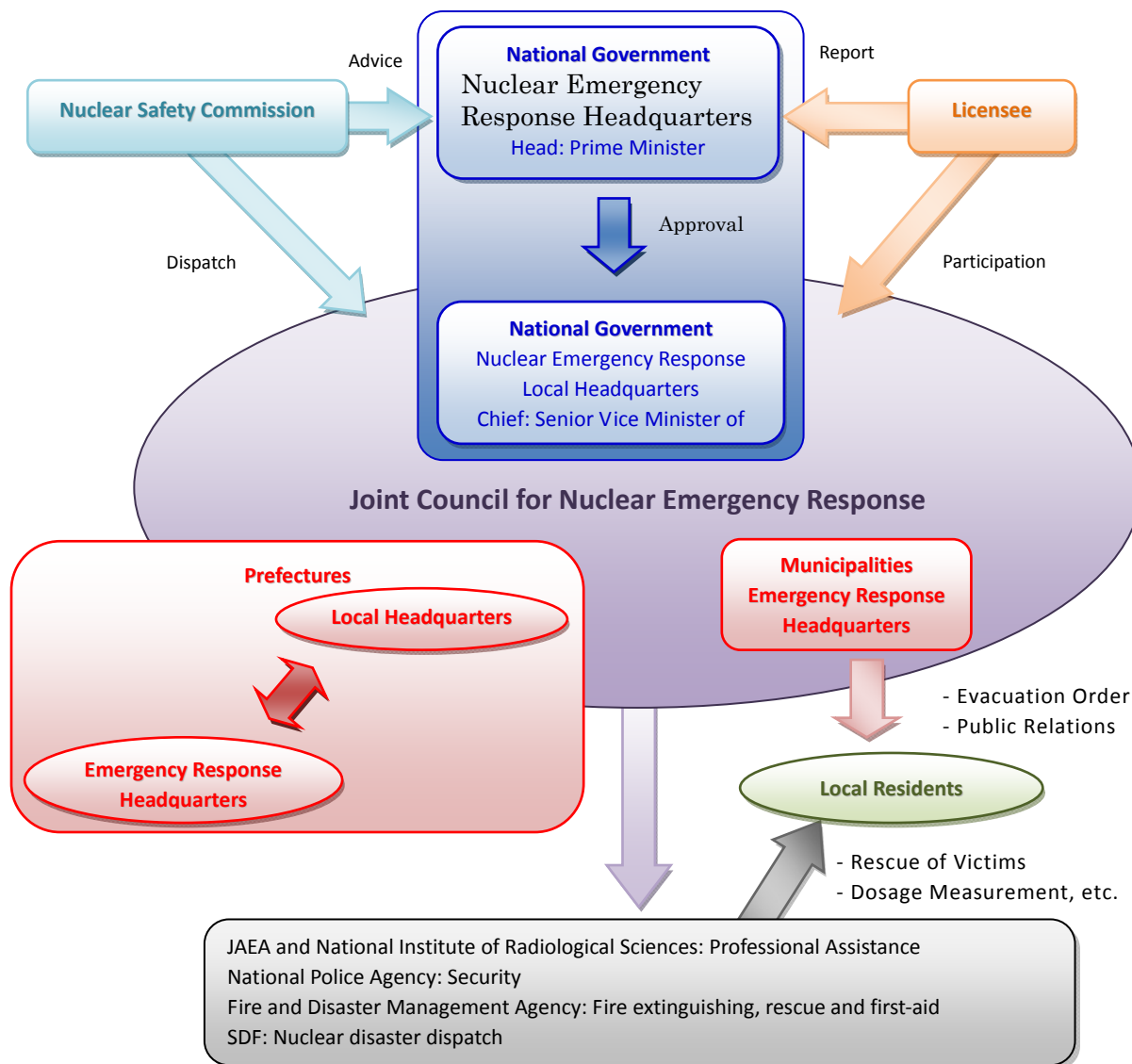


Figure II-2-2 Outline of the organizations relating to nuclear emergency responses