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Nuclear Regulation Authority

Protect the Public and the Environment



Nuclear Regulation Authority

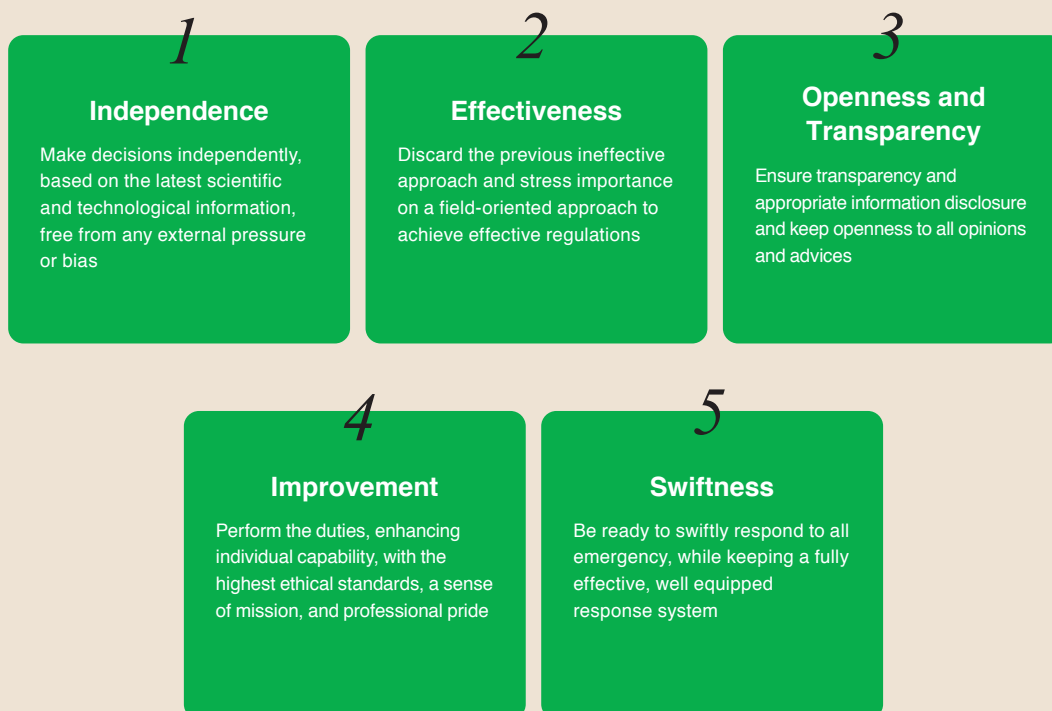
Bearing in mind that:

The Nuclear Regulation Authority (NRA) was founded, with the aim of restoring public trust on nuclear regulatory organization, to establish genuine safety culture, reform nuclear regulatory regime, and prioritize public safety. Everyone involved in nuclear activities must have a high degree of responsibility and ethical values and seek to achieve the highest levels in global safety standards;
We hereby solemnly pledge our full commitment and dedicating efforts to the foregoing.

Mission

Our fundamental mission is to protect the public and the environment through rigorous and reliable regulations of nuclear activities.

Guiding Principle for Activities



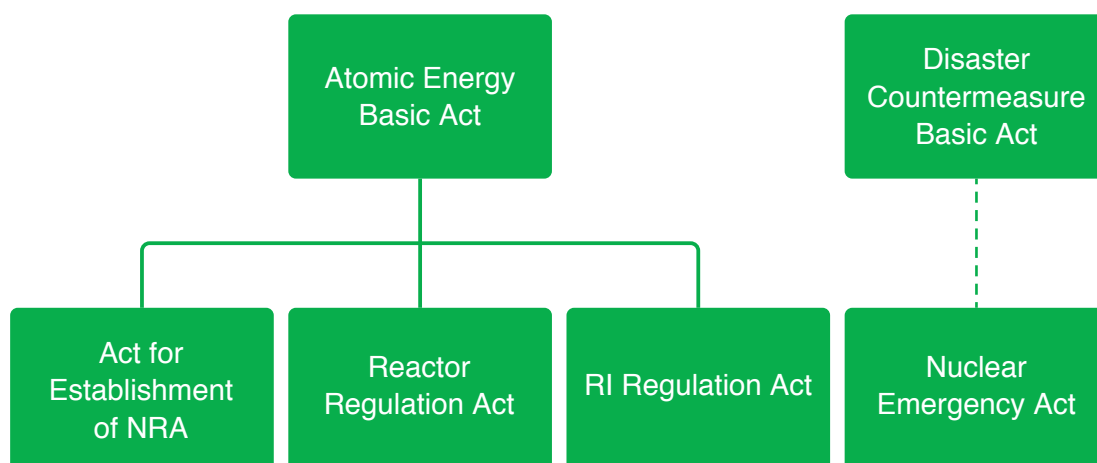


The NRA, which was established as a highly independent regulatory body, states that “we shall make decisions independently, based on the latest scientific and technological information, free from any external pressure or bias” in “NRA’s Core Values and Principles.” While attempting to ensure transparency by holding most meetings and conferences open to public, the NRA is continuing to make decisions in an impartial, neutral, and independent manner from scientific and technological viewpoints.

Activities for Nuclear Safety

Legal Framework

The Atomic Energy Basic Act is the most primary piece of Japanese legislation for nuclear safety and defines the basic principles of nuclear energy use. The Act for Establishment of the NRA and the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Reactor Regulation Act) are enacted to ensure safety for nuclear use, and the Act on the Regulation of Radioisotopes, etc (RI Regulation Act) is enacted to prevent radiation hazards.



The Reactor Regulation Act governing the construction, operation and decommissioning of reactors (and other nuclear facilities, such as test reactors, reprocessing facilities and so on) establishes safety regulations and standards for granting permits and approval, including Reactor Installation Permits, Approval of Construction Plan, Pre-service Inspections, Periodic Inspections, Approvals for Operational Safety Programs and Operational Safety Inspections, and Approval of Decommissioning Plan.

The Act on the Regulation of Radioisotopes, etc. is to provide regulations on the use, selling, leasing, waste management, and other handling of radioisotopes. It also provides regulations on the use of radiation generators, and the waste management and other handling of objects activated by radiation emitted from radiation generators, thereby preventing radiation hazards caused by those activities, to secure specified radioisotopes and to ensure public safety.

The Act on Special Measures Concerning Nuclear Emergency Preparedness (Nuclear Emergency Act) prescribes the responsibilities of the licensees and governments for prevention, preparedness and responses concerning nuclear emergencies, and stipulates also that the national government must take all necessary actions to implement emergency response measures, precautionary protective measures and restorative measures.

Licensing

The NRA developed new regulatory requirements which were significantly enhanced from the previous requirements in the light of lessons learned from the TEPCO's Fukushima Daiichi NPS accident. In this reform, measures against severe accidents were added as regulatory requirements, as well as those against earthquakes, tsunamis and so on were reinforced. The licensee must submit applications on compliance to the new regulatory requirements to the NRA to obtain authorization for their operation of reactors.

To install and operate a new reactor in Japan, it is necessary to obtain the permit for reactor installation (Reactor Installation Permit) and make a specific design; obtain the approval of plan for construction for a specific design (Construction Plan) and carry out construction work; and finally obtain the approval of Operational Safety Programs prior to the start of operation. For existing reactor which had been already authorized, the licensee is responsible for continuous improvement of safety of the reactor in accordance with the state of the art in science and technology based on the back-fitting system, which was introduced with the amendment of the Reactor Regulation Act in 2012 regarding lessons learned from the TEPCO's Fukushima Daiichi NPS accident. This amended Act sets an operational limit of 40 years on the nuclear power facilities and allows a one-time extension up to 20 years after approved by the NRA.

The Act was amended in 2017 (came into force in 2020) in order to strengthen safety measures in the use of nuclear power. Accordingly, the licensee is required to carry out its activities based on its quality management system as a requirement of the Reactor Installation Permit. The licensee is also required to set the Operational Safety Programs before the start of construction, and to design, construct and conduct activities consistently based on the Operational Safety Programs.



Oversight

Nuclear oversight program has been completely revised and implemented in 2020 by the amendment of the Reactor Regulation Act in order for the NRA to enhance effectiveness and efficiency with flexible and comprehensive inspection system. Throughout the program, risk-informed and performance-based approach on ensuring safety is adopted instead of prescriptive checking. From considering inspection items, to determining significance of safety concerns, this approach is referred at every step of program and provides a consistent way of thinking. Graded approach is, at the same time, applied to wide variety of nuclear facilities through inspection practices. Free access is another key to be noticed and further inspect safety concerns among all aspects of safety, and to motivate licensees to keep safety conditions better. Licensees' continuous improvement of safety has great importance in this program, so the NRA puts careful eye on their activities along with the corrective action programs.

Regulation of Radiation Material

The NRA regulates handling of radioisotopes such as usage, selling, leasing, disposal, etc. and use of radiation generators and disposal of radioactively contaminated objects, in order to secure public safety by preventing radiation hazards from use of radioisotopes, etc.* and by protecting specified radioisotopes (radioisotopes exceeding certain quantity, which is specified in the NRA ordinance as have a risk of significant effects on human health when released), based on the RI Regulation Act.

Facilities handling radioisotopes, etc. are used in various types of business fields, so that the regulatory system is designed taking into a Graded Approach concept defined by IAEA Standards. When radioisotopes, etc. are handled, it is required to obtain a permission from NRA based on the Act, and those are regulated commensurate to their respective risk levels.

As for facilities handling radioisotopes, etc., depending on the scale of the facility, etc., obligation of conforming to the technical standards and appointment of radiation protection supervisors, etc. are imposed.

For users of radioisotopes exceeding certain quantity and licensed radioactive waste management operators, a facility inspection to confirm the conformity status to the technical standards is required before the start of handling of radioisotopes, etc., and periodic inspections of confirming that their conformity status is maintained and periodic confirmation of checking compliance with the Act are required after handling has started (registered organizations conduct each inspection or confirmation) .



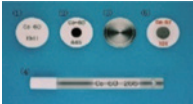

When users discontinue handling of radioisotopes, etc., they have to prepare a decommissioning plan and notify it to NRA, and when the decommissioning has been finished they have to report details and results of the measures taken to NRA.

The Act also requires the security measures to handling specified radioisotopes, not only safety regulations.

Accordingly, the users have to appoint a specified radioisotope security manager, to prepare a specified radioisotope security plan, and also has an obligation to take security measures such as monitoring equipments, necessary barriers and access restriction according to the nuclide, amount and handling method of the specified radioisotopes.

*"Radioisotopes, etc." means radioisotope and radiation generator (including radioactive contaminants)

Regulatory Framework of RI with Graded Approach

| Classification of business | | Examples of users and others |
|---|---|--|
| User who holds the permission and user who has notified | User who holds the specified permission <ul style="list-style-type: none"> ▶ Use of unsealed RI (Storage capacity of the storage facilities: Not less than 100,000 or more times of the exemption level) ▶ Use of sealed RI (Storage capacity of the storage facilities: Not less than 10 TBq) ▶ Use of radiation generator | <ul style="list-style-type: none"> ▶ Radiation sterilization company (^{60}Co) ▶ Radiopharmaceutical manufacturing company (^{99}Mo) ▶ Large-scale research center (radiation generator) ▶ Hospital (^{60}Co, radiation generator)  <p>Radiation generator (example) Linac</p>  <p>RI device (example) Gamma knife</p> |
| | User who holds the permission <ul style="list-style-type: none"> ▶ Use of unsealed RI ▶ Use of sealed RI (Quantity: more than 1000 times of the exemption level) | <ul style="list-style-type: none"> ▶ Non-destructive test company (^{192}Ir) ▶ Hospital using after-loading equipment (^{192}Ir) ▶ Hospital using prostatic-cancer treatment sources (^{125}I) ▶ University using unsealed radioactive sources as reagents |
| | User who has notified <ul style="list-style-type: none"> ▶ Use of sealed RI (Quantity: more than the exemption level and less than or equal to 1000 times of the exemption level) | <ul style="list-style-type: none"> ▶ User of radioactivity calibration sources  |
| Notifier of using approved devices with a certification label <ul style="list-style-type: none"> ▶ Use of approved devices with a certification label * Equipments which have been certified beforehand to comply with the design certified by the government or a registered organization | <ul style="list-style-type: none"> ▶ User of an ECD for gas chromatography  | |
| Licensed radioactive waste management operator Waste management of radioisotopes, etc. as a business | <ul style="list-style-type: none"> ▶ Japan Atomic Energy Agency ▶ Japan Radioisotope Association | |
| Seller who has notified, Lessor who has notified Selling and leasing of radioisotopes, etc. as a business | <ul style="list-style-type: none"> ▶ Seller and lessor of approved devices with a certification label | |

*)RI means radioisotope, and RI sealed to prevent scattering is called sealed RI, and RI which isn't sealed is called unsealed RI.

Safeguards

Ratifying the Nuclear Non-Proliferation Treaty, Japan is obliged to apply the IAEA safeguards, pursuant to the Safeguards Agreement concluded with the IAEA and the additional protocol to the agreement. Japan is also obliged to account for and control nuclear material, based on the bilateral nuclear cooperation agreements concluded with 14 countries and two international organizations.

Japan Safeguards Office (JSGO), placed in the NRA, is the state regulatory authority which has primary responsibilities of establishing and maintaining the State's System of Accounting for and Control of Nuclear Material (SSAC) under the Safeguards Agreement. The JSGO regulates the use of material subject to safeguards in order to fulfill obligations based on this agreement and other bilateral agreements, pursuant to the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material, and Reactors.

To maintain the SSAC, the JSGO puts together the information from users of materials subject to safeguards and provides the IAEA the information through the Ministry of Foreign Affairs. Also, the JSGO confirms by national safeguards inspections that the users' safeguarded materials are properly accounted for and controlled. Moreover, the JSGO supports the IAEA's inspections to verify the information provided by the Japanese government. The IAEA

has concluded that all nuclear material remains in peaceful activities (Broader Conclusion) in Japan for 18 years (as of June 2021).

Nuclear Security

The nuclear security responsibilities of NRA include the protection against illicit trafficking, unlawful taking and use of nuclear and other radioactive material, and the sabotage of facilities and activities involving these material, as well as the international cooperation between states in devising and adopting effective and practical measures for the prevention of terrorism and for the prosecution and punishment of perpetrators. These responsibilities are in accordance with the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities, the International Convention for the Suppression of Acts of Nuclear Terrorism, the Code of Conduct on the Safety and Security of Radioactive Sources, other legally binding and non-binding international instruments.

In order to ensure security of nuclear material the Nuclear Regulation Act sets basic requirements, and 13 Ordinances by NRA prescribe detailed regulatory requirements for security of nuclear material. In addition, the NRA provides licensees with the Design Basis Threat (DBT) or threat assessments as the basis that licensees have to protect against. In accordance with these regulatory requirements, the licensees must develop the security plan that prescribes specific security measures and submit it to the NRA for its review and approval. After the plan is approved, the NRA inspects the licensee's facilities and activities. In the process of the review and inspections, the NRA takes a performance-based approach, in which the NRA raises the awareness and motivation of licensees not only to meet the review standards of nuclear security but also to take the initiative in maintaining and further improving the security system of the facility.

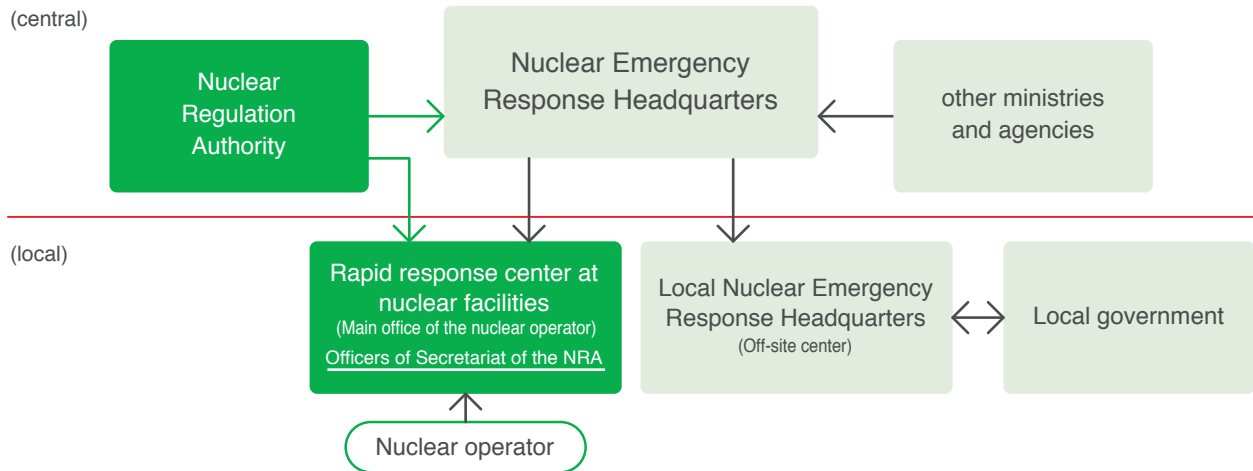
The NRA continues making effort to further enhance the security of nuclear material in Japan. As such efforts, the NRA hosted IAEA International Physical Protection Advisory Service (IPPAS) mission in 2015 and its Follow-up mission in 2018. The provided recommendations and suggestions have been incorporated into the regulatory framework to enhance the nuclear security regime in Japan.

*Nuclear security is defined as the prevention of, detection of, and response to, criminal or intentional unauthorized acts involving or directed at nuclear material, other radioactive material, associated facilities, or associated activities (Nuclear Security - Measures to Protect Against Nuclear Terrorism, GC (49)/17, IAEA).

Emergency Response and Preparedness

The Government of Japan takes measures against nuclear emergency according to the Nuclear Emergency Act. Specifically, in case of General Emergency, the Nuclear Emergency Response Headquarters are set up by the Government of Japan, which the government organizations including the NRA join. Also, the Local Nuclear Emergency Response Headquarters are set up in emergency area in order to implement emergency actions.

Organization at Emergency



The NRA develops the NRA EPR Guide based on the Nuclear Emergency Act in order to ensure a smooth implementation of nuclear emergency response measures by nuclear operators, the national and local governments, and others. Its contents are as follows.

<<Outline of NRA EPR Guide>>

The Guidelines stipulate emergency response measures and their implementing frameworks. The measures are stipulated along the following 3 components.

- ▶ **Nuclear emergency preparedness measures:** Necessary to anticipate a developing emergency even before the occurrence of nuclear emergency and take precautionary measures.
the measures for NPPs are; Establishment of EAL (Emergency Action Level) and OIL (Operational Intervention Level), Introduction of PAZ (around 5km from the facility) and UPZ (around 30km from the facility), Advance preparation of systems and frameworks for nuclear emergency management
- ▶ **Emergency response measures:** Important to institute the most effective measures as speedy as possible, based on actual measured data which is the most credible information.
the measures are; Prompt emergency radiation monitoring, Providing prompt public information, Implementation of proper protective actions based on EAL and OIL
- ▶ **Medium- to long-term measures in response to nuclear disasters:** Necessary to continue proper measures for radioactive materials discharged into environment even once the immediate crisis ends.
the measures are; Long-term evaluation of radiation effects on human health and the environment, Implementation of decontamination measures to minimize effects

To check the effectiveness of emergency response systems in accordance with the Nuclear Emergency Act, Government of Japan conducts the Comprehensive Nuclear Disaster Prevention Drill.

Scientific and Technological Research on Nuclear Safety —

The NRA carries out safety researches in order to establish appropriate regulatory requirements. And, the expertise and knowledge which have been accumulated through conducting those researches are drawn on regulatory activities for licensing (reviews and examinations etc.).

Specifically, the NRA conducts experiments and analyses on the safety of nuclear facilities (nuclear power reactors, nuclear fuel cycle facilities, radioactive waste disposal facilities etc.) on the safety research.

Research for Reactor System Safety

This research covers over the thermal-hydraulic and neutronic behaviors in nuclear reactors during accidents and the influence of nuclear material aging and fire protections on safety performances of nuclear facilities.

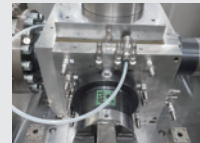


Interests of Research

- ▶ Fuel safety
- ▶ Thermal-hydraulic behavior in light-water reactors during accidents
- ▶ Human and organizational factors on nuclear safety
- ▶ Aging evaluation of nuclear materials
- ▶ Fire protections for NPSs
- ▶ Decommissioning of TEPCO's Fukushima Daiichi NPS

Research for Radiation Protection and Radioactive Waste Management

This research covers over decommissioning of nuclear facilities, disposal of radioactive waste and radiation protection.

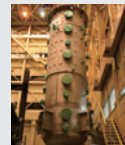


Interests of Research

- ▶ Performance assessment of radioactive waste disposal
- ▶ Measurement methods of radioactive concentration of radioactive waste
- ▶ Estimation methods of radiation dose and health risk for radiation protection.

Research for Severe Accident

This research covers over the predictable risks according to the level of accidents and validity of measures in preparation for a severe accident in a nuclear power station.



Interests of Research

- ▶ PRA research in order to evaluate the risks of a nuclear power station in a severe accident
- ▶ Severe accident phenomena in terms of mechanisms and effectiveness of countermeasures
- ▶ Environmental impact evaluation methods following the release of radioactive materials
- ▶ Emergency response to nuclear disasters

Research for Earthquake, Tsunami and Volcano

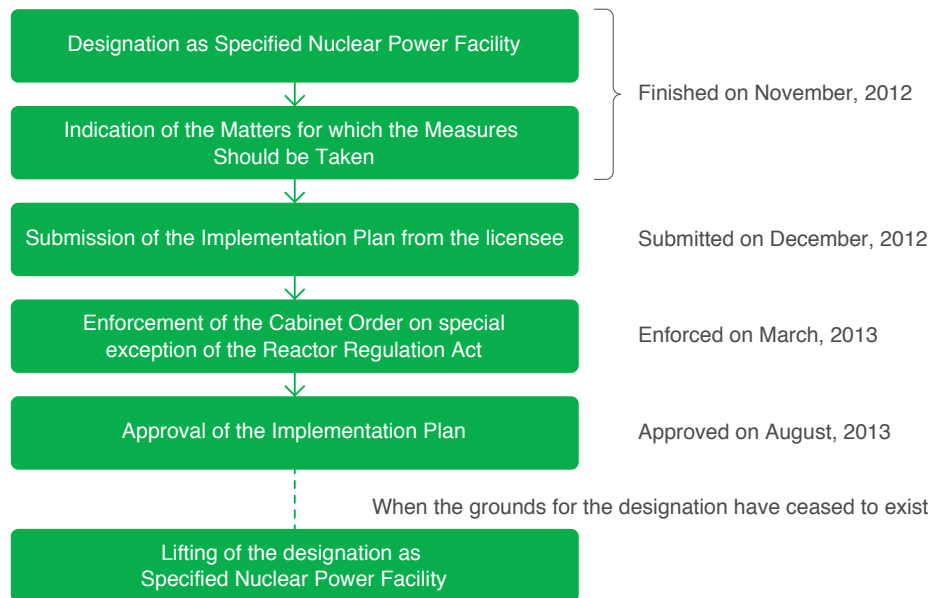
This research covers over uncontrollable external events (natural disasters, such as earthquakes and tsunamis) and integrity of buildings and components in nuclear facilities affected by external events.



Interests of Research

- ▶ Evaluation methods of natural phenomena, including earthquakes, tsunamis and volcanos
- ▶ Integrity of buildings, structures, civil engineering structures, and components against earthquakes and tsunamis
- ▶ Behavior of structures subject to aircraft impacts

Oversight on TEPCO's Fukushima Daiichi Nuclear Power Station Decommissioning



Considering the needs of the special and long-term management of TEPCO's Fukushima Daiichi NPS (1F-NPS), the NRA designated the plant as a "Specified Nuclear Power Facility" on November 2012, in accordance with the Reactor Regulation Act. The NRA gave the licensee a list entitled "Matters for which the Measures Should be Taken", which gives safety requirements for a plan of implementation of 1F-NPS decommissioning. The plan had been submitted from TEPCO in December 2012 ("Implementation Plan") and approved by the NRA in August 2013.

Corresponding to the progress of 1F-NPS decommission activities, the plan has been continually amended.

Through the approval of the Implementation Plan and inspections at the site, the NRA has been supervising TEPCO's activities for appropriate decommission of its Fukushima Daiichi NPS. The NRA conducts a careful examination of applications for approval of changes to the Implementation Plan submitted by TEPCO. The NRA also conducts daily inspection by resident inspectors and facility inspections by NRA headquarter inspectors and resident inspectors.

Investigation, analysis and research of TEPCO's Fukushima Daiichi NPS Accidents

- ▶ The NRA continues to study the Accidents through reviewing records and watching facilities of 1F-NPS. Recent findings include:
 - Detailed status of components under Severe Accident situation
 - Progression of hydrogen combustion
 - Probable path of fission materials

Radiation Monitoring after the TEPCO's Fukushima Daiichi NPS Accident

- ▶ The NRA engaged in the post-accident radiation monitoring of the TEPCO's Fukushima Daiichi NPS based on the "Comprehensive Radiation Monitoring Plan" by carrying out general environmental monitoring throughout Fukushima Prefecture and monitoring of the waters around the TEPCO's Fukushima Daiichi NPS and of the Tokyo Bay. The results of the monitoring are released every month.

International Cooperation

Cooperation with International Organizations

The NRA cooperates with international organizations such as IAEA and OECD/NEA. The cooperation with IAEA covers the areas of nuclear safety, nuclear security and safeguards. The NRA also cooperates with OECD/NEA in the field of nuclear safety.

Bilateral/Multilateral Cooperation

The NRA cooperates with overseas nuclear regulatory authorities to exchange information. In addition, the NRA participates in multilateral frameworks, including the International Nuclear Regulators Association (INRA) and the Top Regulators' Meeting on Nuclear Safety among China, Japan and Korea (TRM). When it comes to the Western European Nuclear Regulators Association (WENRA), the NRA attends it as an observer.

Participation to the Activities under International Conventions

Japan is a contracting party to the following international conventions; the Convention on Nuclear Safety, the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management and the Convention on the Physical Protection of Nuclear Material and Facilities. The NRA participates regularly in the Review Meetings of these conventions as a national regulator. The NRA is also a national competent authority of Emergency Conventions; the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

Convention on Nuclear Safety

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

Convention on the Physical Protection of Nuclear Material and Nuclear Facilities

Convention on Early Notification of a Nuclear Accident

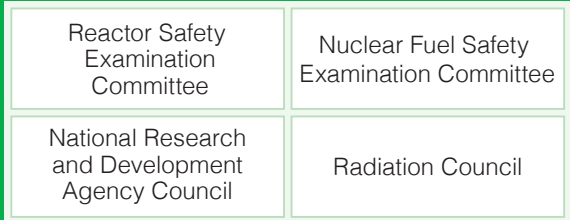
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency

Organizational Chart

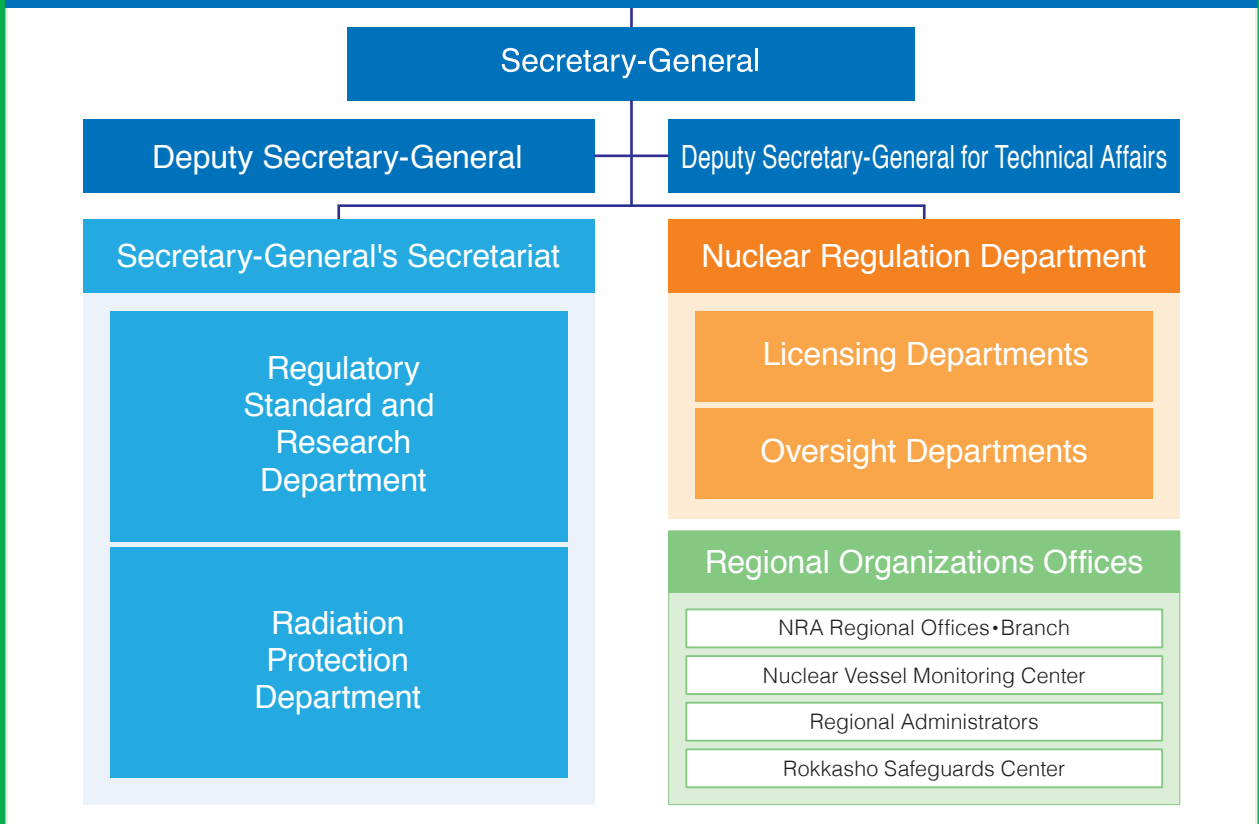
The Nuclear Regulation Authority



NRA Human Resource Development Center



The Secretariat of the Nuclear Regulation Authority



Technical Support Organizations

Japan Atomic Energy Agency (JAEA)
Nuclear Safety Research Center

National Institutes for Quantum Science and Technology (QST)

Regional Organizations

NRA Regional Offices

• NRA Regional Offices · Branch

- To be stationed near nuclear facilities for inspections of them and nuclear emergency preparedness disaster management
- To cooperate with relevant organizations to oversee environmental radiation

● Regional Administrators

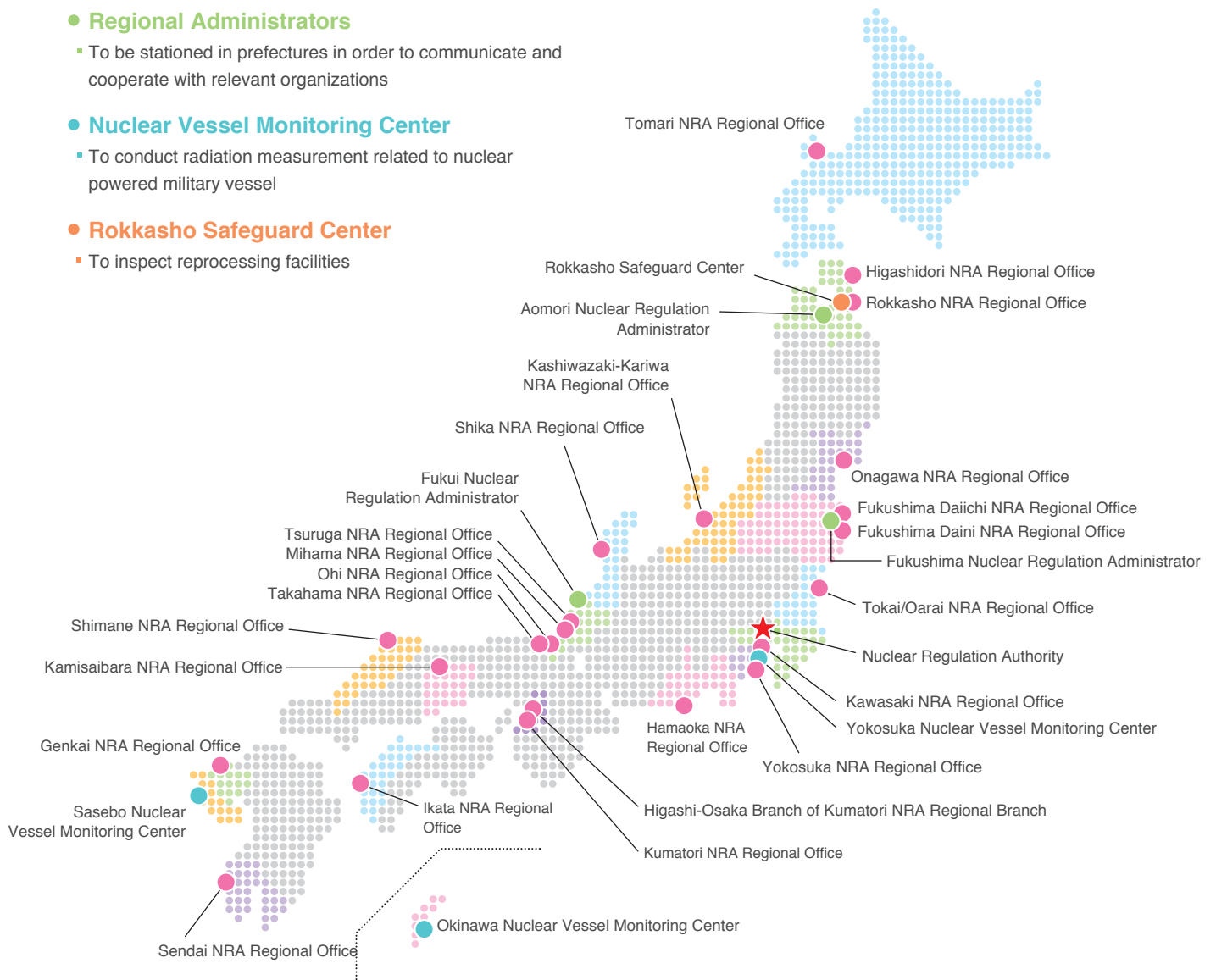
- To be stationed in prefectures in order to communicate and cooperate with relevant organizations

● Nuclear Vessel Monitoring Center

- To conduct radiation measurement related to nuclear powered military vessel

● Rokkasho Safeguard Center

- To inspect reprocessing facilities





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- Take the Namboku Line of Tokyo Metro to Roppongi Itchome station, N05. It takes four minutes to walk to the NRA headquarters.
- Take the Hibiya Line of Tokyo Metro to Kamiya-cho station, H05. It takes eight minutes to walk to the NRA headquarters.