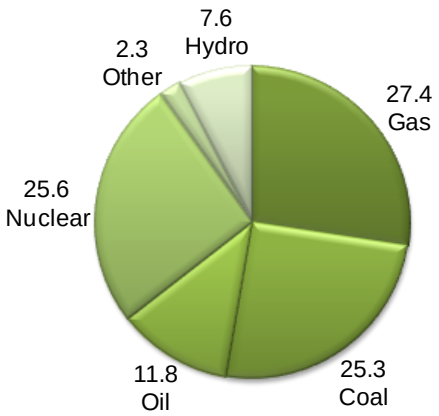
**RADIOACTIVE WASTE MANAGEMENT PROGRAMMES IN OECD/NEA MEMBER COUNTRIES**

# JAPAN
**[2010]**

## NATIONAL NUCLEAR ENERGY CONTEXT

Commercial utilisation of nuclear power in Japan started in 1966 and by 2009 there were 53 nuclear power units connected to the electricity grid. In FY2007 a total of 264 TWh of electricity, 25.6% of the total production, was generated using nuclear power.

A series of light water reactors (LWRs), both pressurised water reactors (PWRs) and boiling water reactors (BWRs) have been constructed by ten electricity companies. The fast breeder reactor (FBR) have been developed by the Japan Atomic Energy Agency (JAEA). A gas-cooled nuclear power plant at Tokai power station, operated by the Japan Atomic Power Company (JAPC), was shut down in March 1998, and a JAEA developed heavy water moderated, light water-cooled reactor (ATR) was shut down in 2003 and two BWRs (Hamaoka 1 and 2) were closed in 2009 for decommissioning. At the end of FY2009, 23 PWRs and 30 BWRs were in operation, with a combined electricity generating capacity of about 48 GWe. The research and development of nuclear fuel cycle technology has been performed mainly by JAEA.




Breakdown of electricity sources (in %)

## SOURCES, TYPES AND QUANTITIES OF WASTE

Radioactive waste in Japan is classified into two main categories according to its level of activity, namely high-level waste (HLW) and low-level waste (LLW). Depending upon its origin, the LLW is further sub-classified into waste from power reactors, waste containing transuranic radionuclides (TRU), uranium waste and radioactive waste from radioisotope use, nuclear research and other related facilities (hereinafter referred to as "Waste from Research Facilities, etc."). An additional category of very low-level waste (VLLW) from reactor sites is also recognised.

The *Reactor Regulation Law* provides for the setting of upper limits on the concentrations of radionuclides in waste authorised for disposal from reactor facilities. These upper limits have been formulated on the basis of a report published by the Nuclear Safety Commission of Japan (NSC) and are used in the preparation of licence applications.

At the other end of the activity scale, the NSC is discussing "clearance levels" for radioactive waste. These are radionuclide concentrations below which waste may be released from radiological control, on the basis of a concept set out by the Japan Atomic Energy Commission (JAEC). Clearance levels have already been published for waste from light water reactors, gas-cooled reactors, heavy water reactors, fast breeder reactors and fuel-cycle facilities, together with details of methods for their certification. The Nuclear Safety Commission of Japan (NSC) published the report on clearance level of the metal generated from dismantling of the uranium facilities on 6 October, 2009.

### High-level radioactive waste (HLW)

HLW includes the highly active liquid that arise from the reprocessing of spent nuclear fuels, and the solid glass waste form produced by the vitrification of these liquids. It contains substantial quantities of both fission products and actinides.

### Low-level radioactive waste (LLW)

This is the general category of radioactive waste, other than HLW, which arises from various facilities and is sub-classified in some cases according to its origin.

### Very low-level radioactive waste (VLLW)

VLLW is waste with a very low level of activity that is suitable for shallow ground disposal without the need for waste encapsulation or engineered structures.

### Transuranic waste (TRU)

This is low-level radioactive waste arising from spent fuel reprocessing and mixed-oxide fuel fabrication that contains radionuclides of atomic number larger than uranium (e.g. neptunium plutonium, americium, etc.).

### Waste from uranium fabrication facilities

This is the waste that arises from uranium fuel fabrication facilities, uranium enrichment facilities and other similar facilities. It contains the very long-lived uranium together with the products of its radioactive decay. Much of this waste comprises VLLW.

**Waste from Research Facilities, etc.**

This waste is LLW that arises specifically from research institutes and other facilities that use radioisotopes such as hospitals and industrial facilities. The amounts of radioactive wastes in storage in Japan in 2009 are shown in the table below, together with some information about disposals of LLW and VLLW and clearance of waste arising from decommissioning of nuclear facilities.

| Category of waste | | Cumulative amount of waste (as of March 2009) |
|---|---|---|
| High-level radioactive waste (vitrified waste) | | 1,614 canisters (vitrified waste)<br>404m$^3$ |
| Waste generated from nuclear reactors | Low-level radioactive waste Containing comparatively High radioactivity (core internal structure, etc.) | Control rod: 8,926<br>Channel box, etc.: 62,375 |
| | Low-level Radioactive waste | 625,169 drums (200 L) at nuclear power plants (200,619 drums (200 L) were Disposed at Rokkasho disposal facility) |
| | Very low-level Radioactive waste | (1,670 tonnes were disposed at JAEA's Tokai site) |
| TRU waste | | 103,149 drums (200 L)<br>3,908m$^3$ at JAEA |
| Waste originating from uranium fabrication facilities | | 44,139 drums (200 L) |
| Waste from Research Facilities, etc. | | Approximately 560,000 drums (200 L) |

*This figure includes "TRU waste" and JAEA "waste from uranium fabrication facilities".

## RADIOACTIVE WASTE MANAGEMENT POLICIES AND PROGRAMMES

**Waste management policies**

In Japan, the disposal of LLW from nuclear reactors has taken place since 1992. In regard to disposal of the high-level vitrified radioactive waste from reprocessing of spent fuel, a *Specified Radioactive Waste Final Disposal Act* came into force in June 2000, defining the procedure for disposal-site selection, the nature of the implementing entity involved and the arrangements for accumulation of the necessary funds. Agency for Natural Resources and Energy (ANRE), Ministry of Economy, Trade and Industry (METI) amended the *Specified Radioactive Waste Final Disposal Act* in June 2007. According to this amendment, TRU wastes from reprocessing that need to be geologically disposed of and high level radioactive wastes that are returned from overseas reprocessing plants in exchange for TRU wastes were added to the wastes to be finally disposed of by the Nuclear Waste Management Organization of Japan, and generators of such radioactive wastes were legally requested to provide the cost needed for final disposal.

The basic policy, however, is that responsibility for treatment and disposal of radioactive waste lies with the operators who have generated the waste.

## Programmes and projects

### *LLW disposal programme*

The Japan Nuclear Fuel Limited (JNFL) low-level radioactive waste disposal centre at Rokkasho-mura, in Aomori Prefecture, has been in operation since 1992. JNFL is permitted to dispose of 400 000 drums at the centre, and by the end of FY 2008 had buried some 211 000 drums of homogeneous and solidified LLW from nuclear power plants.

The JAEC Advisory Committee on Nuclear Fuel-Cycle Backend Policy has discussed the policy for disposal of wastes containing comparatively high-level levels of beta- and gamma-emitting radionuclides, such as spent control rods, burnable poisons, and reactor internals, which arise from operation and decommissioning of nuclear power plants. The Advisory Committee published its findings on this subject in October 1998, and proposed the concept of underground disposal, at a depth of 50-100 metres, for example. Following this proposal, the NSC issued a report on the basic policy for regulation and the setting of radionuclide concentration limits for disposal of such waste. Since 2002, and following a one-year preliminary study, JNFL has been conducting a detailed survey of the geology and groundwater at Rokkasho-mura for the design of such a disposal facility.

The Advisory Committee also discussed the treatment and disposal of low-level waste arising from nuclear research and the use of radioisotopes (Waste from Research Facilities, etc.). In May 1998, it issued a report entitled "Guidelines on Treatment and Disposal of Radioactive Waste from Radioisotope Use, Nuclear Research and Other Related Facilities". Since then, the NSC has been discussing the basic policy for regulating disposal of such waste. In Sep. 2006, the report of the discussions in the Council for Science and Technology was published. Based on the report, MEXT amended the Law for the Incorporated Administrative Agency, JAEA, in May 2008, and the JAEA was designated as the implementation entity of the disposal of the Waste from Research Facilities, etc.

### *TRU waste disposal programme*

TRU waste is generated at the JAEA Tokai reprocessing plant and at the mixed oxide (MOX) fuel fabrication facilities. TRU waste from the reprocessing of Japanese spent fuel sent overseas have been vitrified and returned to Japan. The JNFL commercial reprocessing plant at Rokkasho-mura will generate the same type of waste. The NSC is currently discussing the basic policy for regulating disposal of this waste.

### *Legal framework for HLW disposal*

As described above, the *Specified Radioactive Waste Final Disposal Act* sets out the overall scheme for implementing disposal of vitrified HLW. It defines the roles and responsibilities of the government, the new implementing organisation, the Nuclear Waste Management Organisation of Japan (NUMO), the new fund management organisation, the Radioactive Waste Management Funding and Research Centre (RWMC) and the power reactor owners.

Under the act, Agency for Natural Resources and Energy (ANRE), Ministry of Economy, Trade and Industry (METI), on behalf of the government, is responsible for defining the basic policy and disposal plan. ANRE is also responsible for supervising the activities of NUMO and RWMC.

In accordance with the act, NUMO is responsible for planning and conducting disposal site selection and site characterisation. It is also responsible for submitting the relevant licensing applications for repository construction, operation and closure. Site selection will be carried out in a stepwise manner. In the first step, preliminary investigation areas will be selected on a nationwide scale. This will be done mainly by a literature survey, and a survey of the long-term stability of the geological environment. In the second step, and on the basis of the preliminary investigations, areas will be selected for detailed surface-based investigations, including the drilling of boreholes, to evaluate the characteristics of the geological environment. In the final step, and on the basis of the surface investigations, potential disposal sites will be selected and investigated by way of underground facilities. NUMOs site selection activities are overseen by ANRE of METI. At the every step NUMO must consult the relevant local population and ANRE of METI consults the relevant local governors and mayors, all of whose opinions will be respected.

As the generators of HLW, the nuclear power reactor owners are responsible for sharing the costs of HLW disposal and for contributing to the national fund in proportion to the amounts of electricity they generate. METI authorises the budget of the NUMO programme and supervises the RWMC management of the national fund. The total cost of the programme is currently estimated by the Advisory Committee for National Resources and Energy to be approximately 3 trillion yen (corresponding to 0.13 yen/kWh) for a repository designed to accommodate 40 000 canisters of HLW.

***HLW disposal development***

In December 2002, in the first step of the siting process, NUMO invited municipalities to volunteer preliminary investigation areas (PIAs) as potential candidate sites. At the same time, it published four information documents entitled “Instructions for Application”, “Siting Factors for the Selection of the Preliminary Investigation Areas”, “Repository Concepts”, and “Site Investigation Community Outreach Scheme”. These documents are aimed at providing basic information for discussions amongst stakeholders and the general public of municipalities, and to support them in deciding whether they could accept the planned repository in their municipality. The selection procedure for PIAs will be finalised by the cabinet.

Following acceptance of an application from a volunteer municipality, NUMO will conduct an area-specific literature survey of earthquakes, volcanic activity, uplift and erosion. The evaluation of the area will then be conducted by way of a comparison with NUMOs siting criteria. The evaluation results will be documented in a report for each area, and will be submitted to the governors and mayors of the municipalities concerned. NUMO will make the evaluation report available for inspection in relevant prefectures and will invite comments on it. It will then compile the comments in another report, together with its own responses to the comments. This further report will then be sent to the governors and mayors of the relevant municipalities. With regard to the comments on the evaluation report, NUMO will select PIAs from the areas covered by the area-specific literature survey and will submit an application for approval of the selection of PIAs to ANRE of METI. According to the act, ANRE of METI must invite comments from the governors and mayors of the relevant municipalities and respect their comments in approving selection of the PIAs.

In Toyo-Town of Kochi Prefecture, study meetings was held since September 2006, under the auspices of the Town and other organizations, and the mayor of the Town submitted an offer for the start of the preliminary investigation to NUMO, 2007. Upon receiving the offer of Toyo-Town, NUMO filed the application in accordance with the *Specific Radioactive Waste Final Disposal Act*, but the Town cancelled the offer in April 2007 and the preliminary investigation is not performed.

The Radioactive Waste Subcommittee under the Nuclear Energy Subcommittee of the Advisory Committee for Natural Resources and Energy prepared an interim report on the enhancement of the activities to promote the final disposal. The report requires that the government should, by itself, ask local

governments to conduct literature survey, while maintaining the present procedure of open solicitation of candidate areas. The report also asks the government, NUMO and electric utilities to enhance national and regional public relations, to propose regional development plans, to enhance research and development and international cooperation for promoting the public understanding. Specifically, publicity works are conducted in each prefecture in Japan and workshops are organized associate with non political organizations in the outskirts of the site.

***Returned vitrified HLW from overseas reprocessing***

Japanese utilities have their spent nuclear fuel reprocessed by Cogema of France and BNFL of the United Kingdom. The contracts for these services entitle Cogema and BNFL to return the vitrified residues to their Japanese customers, and both Cogema and BNFL have decided to do so. The vitrified HLW to be returned is currently estimated to be about 2 200 canisters in total. The HLW waste canisters are placed securely inside specially-designed transport casks, and transport is by sea in a specially designed vessel. The casks and the vessel are designed and manufactured in accordance with all the relevant safety standards of the International Atomic Energy Agency (IAEA) and the International Maritime Organization (IMO). The first vitrified waste received from France was unloaded on 26 April 1995 at Mutsu-Ogawara, the port for Rokkasho-mura, in Aomori Prefecture. Each item of vitrified waste was checked for appearance, surface contamination, size, weight, containment, radioactivity calorific value, etc. and, after checking and confirming the inspection data, the Agency of Nuclear and Industrial Safety gave its approval for the wastes to be placed in the storage pits of the JNFL vitrified waste storage centre at Rokkasho-mura. All the received vitrified wastes will be stored there for 30 to 50 years.

The transport of vitrified waste from France and the United Kingdom to Japan is expected to continue for at least 10 years, at a frequency of one or two shipments per year according to Japanese utilities. By March 2008, 1,310 vitrified canisters had been returned from France, and the canisters from United Kingdom in total of 2,200 canisters together with those from France will be returned in the next ten-odd years.

## RESEARCH AND DEVELOPMENT

### Research infrastructure

***Research infrastructure by Implementation Side***

Concerning R&D in the implementing phase, JAEC specifies its framework in the national policy, "Framework for Nuclear Energy Policy" issued in October, 2005 (Tentative Translation can be ordered at http://www.aec.go.jp/jicst/NC/tyoki/taikou/kettei/eng_ver.pdf). Following this R&D framework, METI/ANRE states in its Basic Policy that:

- NUMO is responsible for conducting R&D for safe implementation of the repository with improved technology from economic and practical perspectives.
- The Government and relevant organizations including JAEA should proceed with R&D for establishing the safety-regulation framework, other fundamental issues related to safety assessment, geoscientific studies, and improving repository technology from the viewpoint of increasing confidence.

For establishing a sound basis on which a sufficient level of public confidence will be built, it is essential for the technical community to be duly confident in the engineering feasibility as well as in the long-term safety of geological disposal system. This can be accomplished by conducting well designed and quality controlled R&D activities and the integration of results thereof into a form of collective confidence of a technical community as a whole.

With a substantial amount of experiences and expertise in this field, the JAEA's Geological Isolation Research & Development Directorate (GIRDD), continues to bear the responsibility for R&D activities aimed to enhance the reliability of repository technology and to establish safety-assessment methodology and a relevant database. Among these, the demonstration of a site-characterization methodology from the ground surface in two ongoing URL projects (at Mizunami and Horonobe) is essential for supporting NUMO's programme as well as for establishing relevant regulatory infrastructure at an early stage. Basic studies and experiments to be conducted in experimental facilities ENTRY, QUALITY and NUCEF will contribute to better understanding of the observed phenomena in two URLs.

Apart from JAEA/GIRDD there are other organizations such as RWMC, Central Research Institute of the Electric Power Industry (CRIEPI), National Institute of Advanced Industrial Science and Technology (AIST) and NIRS which are also promoting R&D to support government policy-making, formulation of regulations and implementation of the HLW disposal programme. In July 2005, a "Coordination Executive" was established to maximize the output from these R&D organizations, including JAEA/GIRDD. The Executive is comprised of senior members of R&D organizations and is chaired by ANRE of METI. The regulator and its associated R&D organizations and NUMO have been participating in it as observers. From April 2009, NUMO has become a member of the Executive more actively to take a lead of the national R&D programme.

***Research infrastructure by Regulation Side***

Infrastructure for regulatory research is independently constructed under Nuclear and Industrial Safety Agency (NISA). NISA promotes regulatory support research in cooperation with Japan Nuclear Energy Safety Organization (JNES), Nuclear Safety Research Center (NSRC) of JAEA and the Research Core for Deep Geological Environments (RCDGE) of AIST.

In the field of geological disposal, JNES, JAEA and AIST concluded "the agreement concerning the safety of radioactive waste in geological disposal" and are promoting joint research, human resource exchange, sharing of the data in this field.

**R&D on HLW disposal**

***Research and development for Implementation***

In regard to implementation of R&D on HLW disposal, JAEC has specified the overall framework in the Long-Term Programme issued in November 2000.

NUMO is responsible for conducting R&D focused on the safe implementation of disposal with the best available technology, taking economic and practical aspects into consideration. The Government and other relevant organisations carry out R&D in support of the safety regulation framework and on other fundamental issues related to safety assessment. These include geoscientific studies and repository technology development aimed at increasing confidence in the concept. In this context, JAEA/GIRDD is required to ensure further the reliability of repository technology and to establish safety assessment methodology based upon previous experience and technical achievements. This work will be carried out by the research projects on crystalline and sedimentary rocks at the Underground Research Laboratories (URL) in Mizunami and Horonobe respectively, and on the work at the ENTRY and QUALITY facilities in Tokai.

Surface-based investigation of a site at the Mizunami URL has been in progress since 1996. Mizunami City has proposed transferring the work to a municipally-owned area, and an agreement for use of this area between the city and JAEA/GIRDD was signed in January 2002. Shaft sinking was to start in 2003. The Horonobe URL project was approved by the agreement between the local Governments and JAEA/GIRDD in November 2000. A JAEA/GIRDD office was opened in Horonobe in April 2001 and a surface-based investigation started. JAEA/GIRDD selected the site for constructing an underground facility in the region of Horonobe town in July 2002. Shaft sinking will begin in 2005. At the end of December 2009, the excavation progressed to a depth of 420 m at Mizunami, and 250 m at Horonobe.

***Research for Regulation***

Regulatory bodies, the NSC and NISA, have introduced research programmes for nuclear safety, independent from the Coordination Executive's comprehensive R&D programme. The regulatory bodies' research programmes cover low- to high-level radioactive wastes and decommissioning of nuclear facilities.

*Nuclear Research Programmes Important to Safety*

The NSC published their report "Nuclear Research Programmes Important to Safety" in July 2004. NSC developed the safety research strategy and identified important research topics to be conducted intensively in five years starting 2005; waste disposal research topics include those to develop site characterization methodology, to establish the fundamental concept of safety assessment, and to develop safety assessment methodology and understand underlying science; decommissioning research topics include those for inventory estimation, to develop safety assessment for workers and the public during dismantling, and establish fundamental concept for site closure.

*Regulatory Support Research Plan*

Nuclear and Industrial Safety Agency (NISA) of METI, also promotes regulatory support research. NISA, based on its regulatory needs, funds regulatory research implemented aiming at establishing safety criteria, and maintaining and developing the safety regulatory infrastructure.

NISA has intensively discussed regulatory research and its implementation structure in Radioactive Waste Safety Subcommittee since October 2008, and issued "Regulatory Support Research Plan on Radioactive Waste Management (2010-2014)" in October 2009.

The main contents of "Regulatory Support Research Plan on Radioactive Waste Management (2010-2014)" are research to support a technical review for the results of stepwise site investigations (the preliminary investigations and the detailed investigations), research to establish fundamental requirements including safety design and basic concept of safety assessment, and to support a technical judgment for licensing application, draft of "Regulatory Research Report on Geological Disposal" and transmission of it in international communities such as IAEA and OECD/NEA, establishment of the quality assurance system on data available for safety regulation and so on.

"The Regulatory Research Report on Geological Disposal" represents the regulatory status for geological disposal, and will be published in accordance with the progress of disposal implementation. The report is also expected to make communications between the regulatory body and the implementer transparent, and gain the public understanding on safety regulation of geological disposal.

## DECOMMISSIONING AND DISMANTLING POLICIES AND PROJECTS

Several nuclear research facilities have already been decommissioned, or are in the stage of planning for final shutdown and decommissioning. So far, the nuclear-powered ship “Mutsu” and the Japan Power Demonstration Reactor (JPDR) have been decommissioned by JAEA. The JAEA Reprocessing Test Facility (JRTF) and the Japan Research Reactor No. 2 (JRR-2) decommissioning programmes and “Fugen” plant decommissioning programmes (http://www.jaea.go.jp/04/fugen/jhaishi_e/index.html) are the current major decommissioning projects in JAEA. For Example, the Fugen nuclear power station, a prototype of the advanced thermal reactor operated by JAEA, was shut down in March 2003. The decommissioning plan of Fugen was approved in February 2008 and the decommissioning activities started.

The Tokai power station, which is the oldest commercial gas-cooled nuclear power plant of the Japan Atomic Power Company (JAPC), was finally shut down in March 1998. This will be the first example of commercial nuclear power plant decommissioning in Japan. The decommissioning notification was submitted in 2001 by the previous regulation system and the decommissioning plan was approved based on the present system in June 2006. Dismantling process is now underway.

Hamaoka Unit 1 and 2, which are BWRs of CHUBU Electric Power Co.,lnc, ended the operation in January 2009 because of economical reason. The decommissioning plan was submitted in June 2009 and was admitted by NISA in November 2009.

### Regulatory Support Research Plan

In NISA, regulatory research for decommissioning has also been planned by Decommissioning Safety Subcommittee since February 2009, and "Regulatory Support Research Plan on Decommissioning (2010-2014)" was issued in November 2009.The main contents of "Regulatory Support Research Plan on Decommissioning (2010-2014)" are research for decommissioning programme of nuclear cycle facilities, research for termination of decommissioning, research for appropriate control of decommissioning waste and so on.

## TRANSPORT

Regulations for the transport of nuclear materials on land are based on the *Law for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Nuclear Reactors*. They are administered by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), METI, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and the Prefectural Public Safety Commission (PPSC). The MLIT and the Japan Coast Guard govern transport by sea under the *Ship Safety Law*, and the MLIT governs transport by air under the *Civil Aviation Act*.

The technical standards for nuclear fuel transport are stipulated in ministerial ordinances and notifications based on the Regulations for the Safe Transport of Radioactive Material recommended by the International Atomic Energy Agency (Safety Requirements No.TS-R-1).

Under these regulations, confirmation of safety is required before shipping of packages containing 0.1 kg or more of uranium hexaflouride, fissile material packages or so-called type B packages. This confirmation is divided into three phases:

- design approval for nuclear fuel packages;
- approval and registration of packaging;
- shipment confirmation for packages and for the method of transport.

## COMPETENT AUTHORITIES

The main government organisations responsible for nuclear safety regulation, including radioactive waste management, are METI/NISA, METI/ANRE, MEXT, and MLIT. They answer to the cabinet, which is advised by the NSC. These ministries and the NSC are supported by various specialist divisions and committees.

In accordance with the *Specified Radioactive Waste Final Disposal Act*, the NUMO was established in 2000 as the organisation responsible for implementing HLW disposal. It was set up by the private sector and was approved by the Minister of Economy, Trade and Industry.

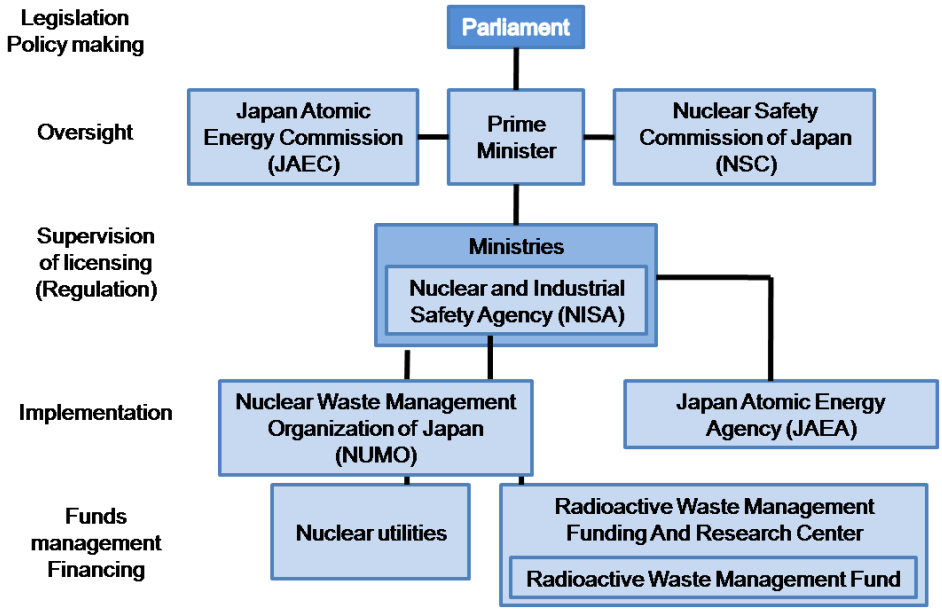
NUMO is responsible for implementation of final geological disposal of HLW and TRU, and for collection of the fees necessary to fund its disposal activities.

The act further specifies that METI shall evaluate the NUMO work plan in order to ensure that it has sufficient technical, financial and human resources to carry out its responsibilities.

METI/ANRE, together with a HLW disposal technical consultants group organised under the Advisory Committee for Energy, will also investigate whether the process for disposal facility siting is scientifically appropriate.

Concerning the disposal of Waste from Research Facilities, etc., MEXT amended the Law for the Incorporated Administrative Agency, JAEA and designated JAEA as the implementation entity of the disposal of the waste in May 2008.

**Main bodies involved in radioactive waste management in Japan**




The key organizations for nuclear safety regulation are as follows:

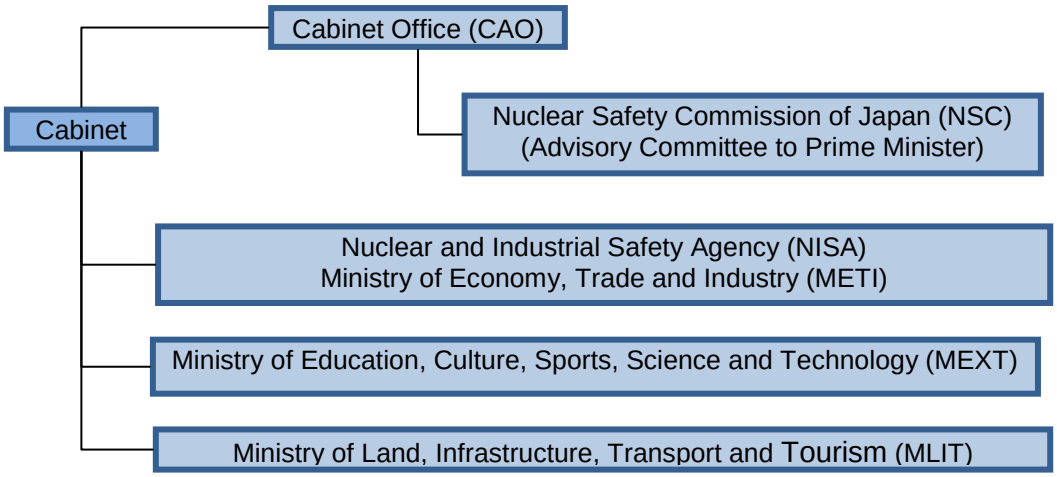
- CAO/NSC
  - Planning, deliberation and decisions on the basic principles related to nuclear safety regulation
  - Establishment of safety standards
  - Review of the results of the safety examination by regulatory bodies (so-called “double check” )

- METI / NISA
  - Regulation of the use of nuclear materials for energy utilization

- MEXT
  - Regulation of scientific use of nuclear materials, use of radio-isotopes, radiation generating apparatuses

- MLIT
  - Regulation of maritime transportation of nuclear materials

**Governmental Organizations Related to Nuclear Safety Regulation**




The main organisations and resources for radioactive waste regulation are as follows:

- Subsequent Regulation Review Division (CAO/NSC)
  - Investigation and examination concerning basic principles of regulation of radioactive waste management
  - Establishment of safety standards of radioactive waste management
  - Review of the safety examinations of radioactive waste management facilities by regulatory bodies

- Radioactive Waste Regulation Division (METI/NISA)
  - Drafting of regulatory laws and provisions
  - Regulation of radioactive waste disposal facilities and storage facilities
  - Regulation of off-site radioactive waste management
  - Regulation of decommissioning of nuclear facilities

  a. Radioactive Waste Safety Subcommittee, Nuclear and Industrial Safety Subcommittee, Advisory Committee for Natural Resources and Energy (METI)
  - Investigation into safety policy concerning radioactive waste disposal and storage

  b. Decommissioning Safety Subcommittee, Nuclear and Industrial Safety Subcommittee, Advisory Committee for Natural Resources and Energy (METI)
  - Investigation into safety policy concerning Decommissioning of nuclear installations

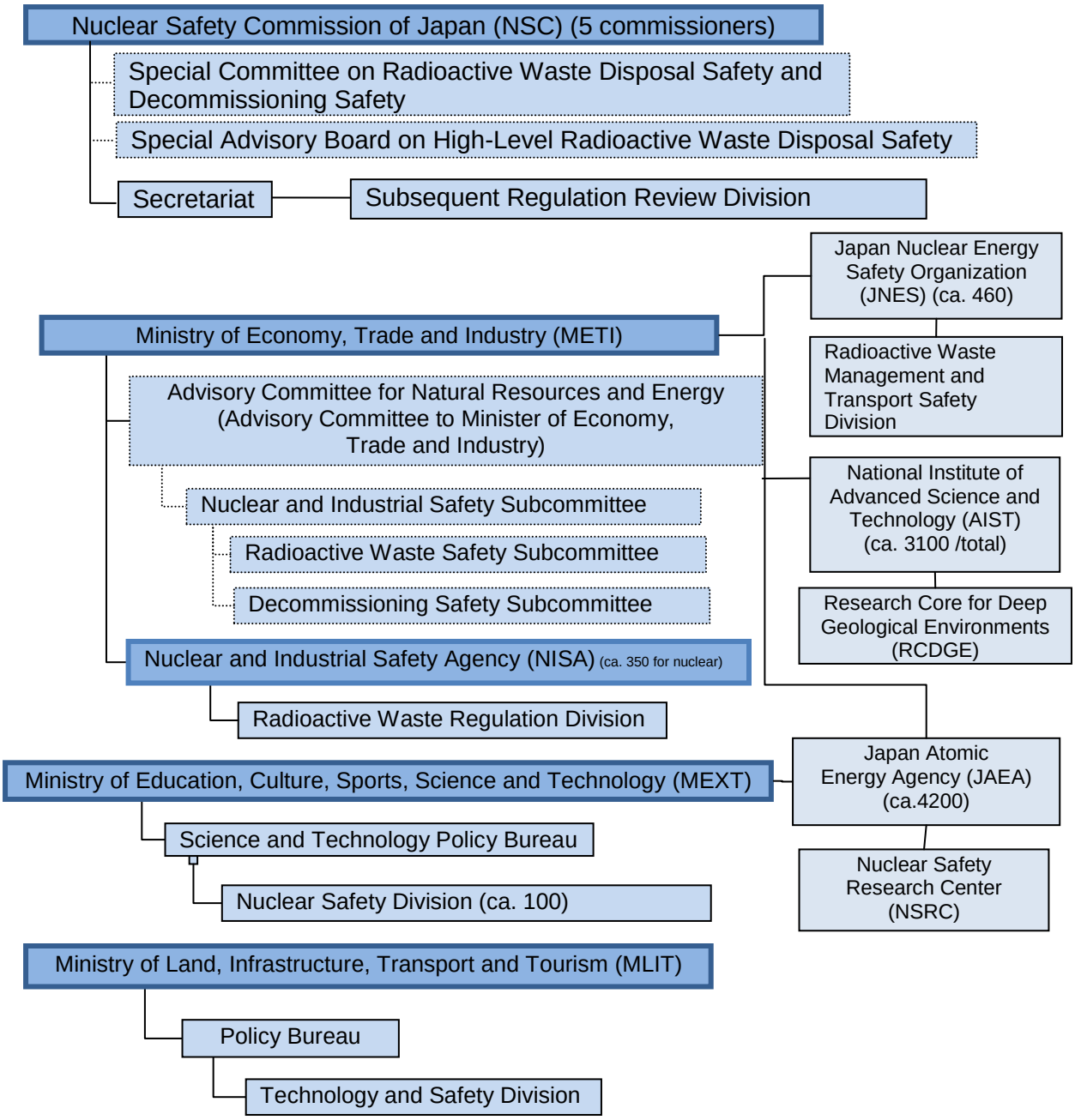
- Nuclear Safety Division, Science and Technology Policy Bureau (MEXT)
  - Regulation of management of radioactive waste originating from scientific use of nuclear materials, use of radio-isotopes and radiation-generating apparatuses and decommissioning of research & test reactors

- Technology and Safety Division, Policy Bureau (MLIT)
  - Regulation of the maritime transportation of radioactive waste

- JNES, JAEA/NSRC and AIST/RCDGE
  - Implementing regulatory support research for NISA

**Governmental Organizations Related to Radioactive Waste Regulation**

(Number shows persons of the organization in total)



# FINANCING

## Financing system for HLW disposal

In accordance with the *Specific Radioactive Waste Final Disposal Act* enacted in May 2000, operators of power reactor facilities deposit funds for disposal of high level radioactive waste to NUMO, the implementing body for disposal, who entrusts management of the fund to RWMC ANRE of METI, every year, notifies utilities of the amount of money to be deposited to the fund. 0.2 yen/kWh is charged as a fee for the HLW and TRU waste management operation. The amount of deposit per vitrified package was 40,413,000 yen in the year of 2007. The amount of money for construction of depository and disposal of about 40,000 vitrified packages of high level waste is estimated about 3 trillion yen. The amount of the money deposited to the Radioactive Waste Management Funding and Research Center at the end of March 2007 was about 500 billion yen.

## Financing system for disposal of Waste from Research Facilities, etc.

As for disposal of Waste from Research Facilities, etc., a generator of waste must pay for the disposal under the principle of generators' responsibility, as set forth in the Framework for Nuclear Energy Policy. The largest generator of the waste, JAEA started funding for disposal basing on the amendment of The Law for the Incorporated Administrative Agency, JAEA in May 2008. The amount of budget plan for fiscal year 2008 is about 4.3 billion yen.

## Funding for decommissioning

For the financial base of the decommissioning of nuclear installations, METI stipulated the Ministerial Order established under the Electricity Utilities Industry Law on the reserves for decommissioning of nuclear power generation facilities. Based on the Ministerial Order, Electric Utilities internally reserved the money for the decommissioning as the expense of dismantling and removal of commercial power reactor facilities, and as the expense of the processing and disposal of the waste from decommissioning. The amount of reserve by the end of March 2007 is about 1,200 billion yen by 10 electric utilities.

Financial basis of a license holder of nuclear fuel material use is to be confirmed through procedures to approve the Operational Safety Programme and the steps to be taken at the time of decommissioning.

## PUBLIC INFORMATION

For more information, the websites of the relevant authorities and organizations are listed below:

Government

**Japan Atomic Energy Commission (JAEC)**
Kasumigaseki, Chiyoda-ku, Tokyo
Website: http://www.aec.go.jp/jicst/NC/eng/index.htm

**Nuclear Safety Commission of Japan (NSC)**
Kasumigaseki, Chiyoda-ku,Tokyo
Website: http://www.nsc.go.jp/NSCenglish/index.htm

**Nuclear and Industrial Safety Agency (NISA),**
**Ministry of Economy, Trade and Industry (METI)**
Kasumigaseki, Chiyoda-ku, Tokyo
Website: http://www.nisa.meti.go.jp/english/index.htm

**Agency for Natural Resources and Energy (ANRE),**
**Ministry of Economy, Trade and Industry (METI)**
Kasumigaseki, Chiyoda-ku, Tokyo
Website: http://www.enecho.meti.go.jp/english/index.htm

**Ministry of Education, Culture, Sports, Science and Technology (MEXT)**
Kasumigaseki, Chiyoda-ku, Tokyo
Website: http://www.mext.go.jp/english/

**Ministry of Land, Infrastructure, Transport and Tourism (MLIT)**
Kasumigaseki, Chiyoda-ku, Tokyo
Website: http://www.mlit.go.jp/index_e.html

Research

**Japan Nuclear Energy Safety Organization (JNES)**
Toranomon, Minato-ku, Tokyo
Website: http://www.jnes.go.jp/english/index.html

**Japan Atomic Energy Agency (JAEA)**
Tokai-mura, Naka-gun, Ibaraki- Prefecture
Website: http://www.JAEA.go.jp/english/index.shtml

1) Geological Isolation Research & Development Directorate (GIRDD)
Tokai-mura, Naka-gun, Ibaraki- Prefecture
Website: http://www.jaea.go.jp/04/tisou/english/index/e-index.html

2) Nuclear Safety Research Center (NSRC)
Tokai-mura, Naka-gun, Ibaraki- Prefecture
Website: http://www.jaea.go.jp/04/anzen/index.html

**National Institute of Advanced Industrial Science and Technology (AIST)**
Tsukuba, Ibaraki- Prefecture
Website: http://www.aist.go.jp/index_en.html
1) Research Core for Deep Geological Environments (RCDGE)
http://unit.aist.go.jp/dgcore/english/index.html

National Institute of Radiological Sciences (NIRS)
Chiba-City, Chiba- Prefecture
Website: http://www.nirs.go.jp/ENG/index.html

**Central Research Institute of the Electric Power Industry (CRIEPI)**
Ohtemachi, Chiyoda-ku, Tokyo
Website: http://criepi.denken.or.jp/en/

Radioactive Waste Management Funding and Research Centre (RWMC)
Tsukishima, Chuo-ku, Tokyo
Website: http://www.rwmc.or.jp/contact/

Industry

**Nuclear Waste Management Organization of Japan (NUMO)**
Shiba, Minato-ku, Tokyo
Website: http://www.numo.or.jp/en/index.html

**Japan Nuclear Fuel Limited (JNFL)**
Rokkasho-mura, Aomori- Prefecture
Website: http://www.jnfl.co.jp/english/index.html

**Japan Atomic Power Company (JAPC)**
Tokai-mura, Naka-gun, Ibaraki-Prefecture
Website: http://www.japc.co.jp/english/