Safety Regulations for Radioactive Waste Disposal Ⅲ

Overview and Activities of MEXT

February 23, 2010

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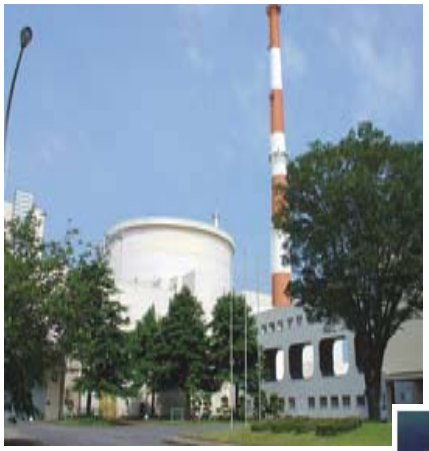
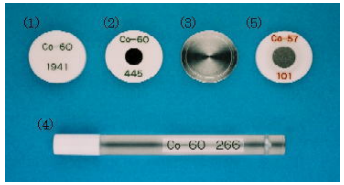
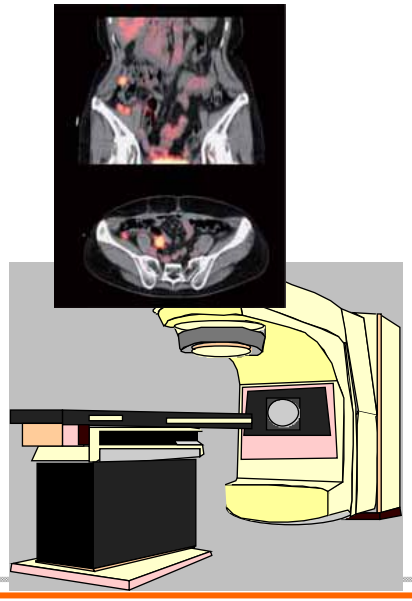
1. Safety Regulations by MEXT

Usage of research & test reactors and nuclear material



Usage of radioisotopes and radiation generating apparatus





Safety Regulation by the Law for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (The Reactor Regulation Law)

Safety Regulation by the Law Concerning Prevention from Radiation Hazards due to Radioisotopes, etc., (The Radiation Hazards Protection Law)

2. Number of the licensed by MEXT and the State of Waste Storage

Under the Reactor Regulation Law

Type of License	Research & Test Reactors	Nuclear Fuel Material User (Governed by ordinance)	Nuclear Fuel Material User (Not governed by ordinance)	Nuclear Source Material User
Number of Licensee	23（15 in operation）	15	194	17

As of January 8, 2010

Under the Radiation Hazards Protection Law

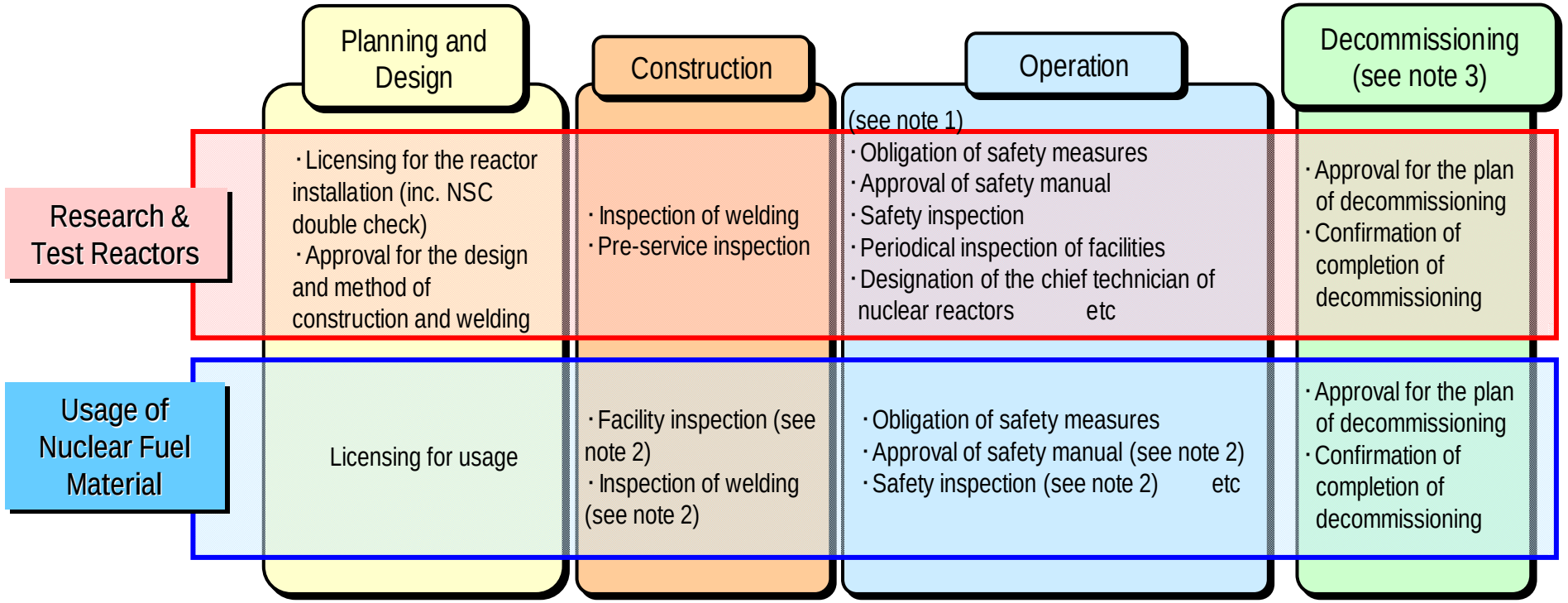
Type of License	Utilization				Sale	Leasing	Disposal	Total
	Approved By MEXT	Notification to MEXT	Certification labels※	Total				
Number of Licensee	2,476	567	2,714	5,757	265	112	9	6,143

※The approved devices with certification labels

As of January 1, 2010

3-1. Regulations by the Law for the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors

●MEXT regulates research and test reactors and installations using nuclear fuel materials by the Law for the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors. Regulations for individual facilities are adapted to take into account the scale of the reactor as well as the types and quantities of nuclear fuel material, which differ greatly among facilities.



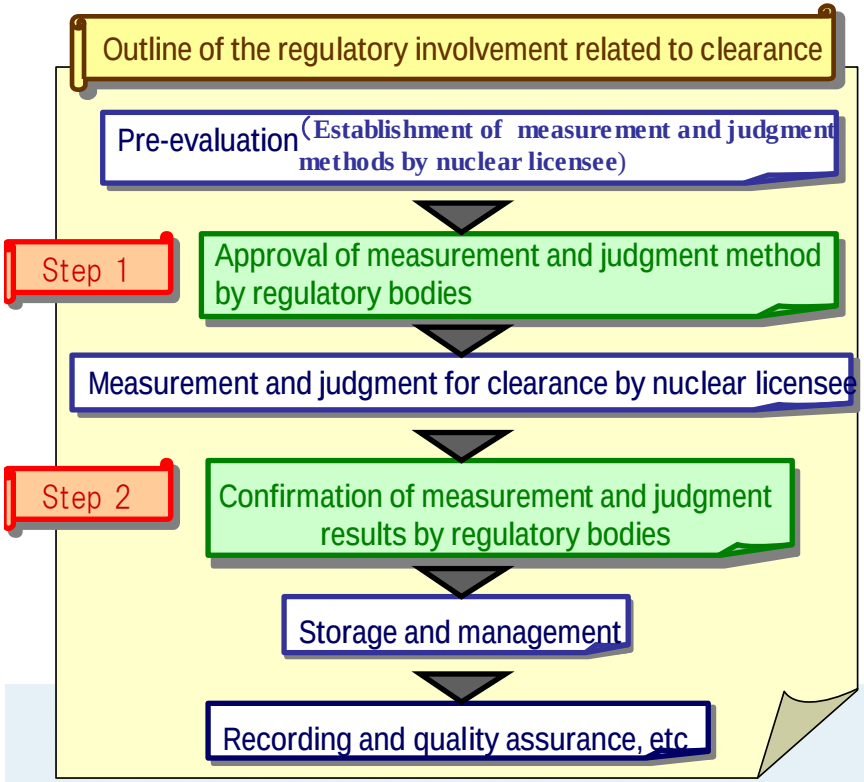
Note 1: Specified nuclear fuel material users are imposed the obligation to safeguard nuclear fuel materials during the operation stage .
Note 2: Applies only to facilities handling quantities of nuclear fuel materials exceeding the level determined by ordinance no. 41
Note 3: Following the May 2005 revision to the Law for the Regulations on Nuclear Source Material, Nuclear Fuel Material and Reactors, the notification system became the permission system.

3-2. Clearance Regulation for JRR-3

● In 2005 a clearance system was introduced under the Law for the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors. This system stipulates that waste generated from nuclear facilities, which emit lower levels of radiation even compared to natural radiation, does not need to be treated as radioactive waste. Waste that has been confirmed by the regulatory bodies is governed by ordinances related to ordinary industrial waste and its recycling as valuable resources.

●Following the introduction of the clearance system, an application was submitted in 2007 for the approval of the method of measurement and evaluation for the JRR-3, and it was approved in 2008. Following the evaluation by the nuclear licensee in accordance with the approved method, a first application for confirmation was submitted in January 2010. The confirmation process in MEXT is going on now.

Outline of the regulatory involvement related to clearance



Overview of clearance plan for JRR-3

General plan

In the modification of JRR-3 of Nuclear Research Center, the Japan Atomic Energy Agency (JAEA), concrete fragments of negligible radioactive level was generated and stored now in waste storage facilities in JAEA.

JAEA plans to reuse the concrete as blast furnace slag at Nuclear Research Center of JAEA if they have clearance from regulatory body, and plans to use unoccupied area of current waste storage facilities for future disposal purpose.

Materials to be confirmed clearance

●Generating facility Japan Research Reactor No.3 (JRR-3)
(modified between 1985 and 1989)
●Material Concrete fragments
●Form Fragments (from concrete), blocks
●Volume Approx. 4,000 tons
●Storage: Waste storage facilities/NL pit inside Nuclear Science Research Institute, JAEA

3-3. Review of Clearance for Facilities Used Uranium

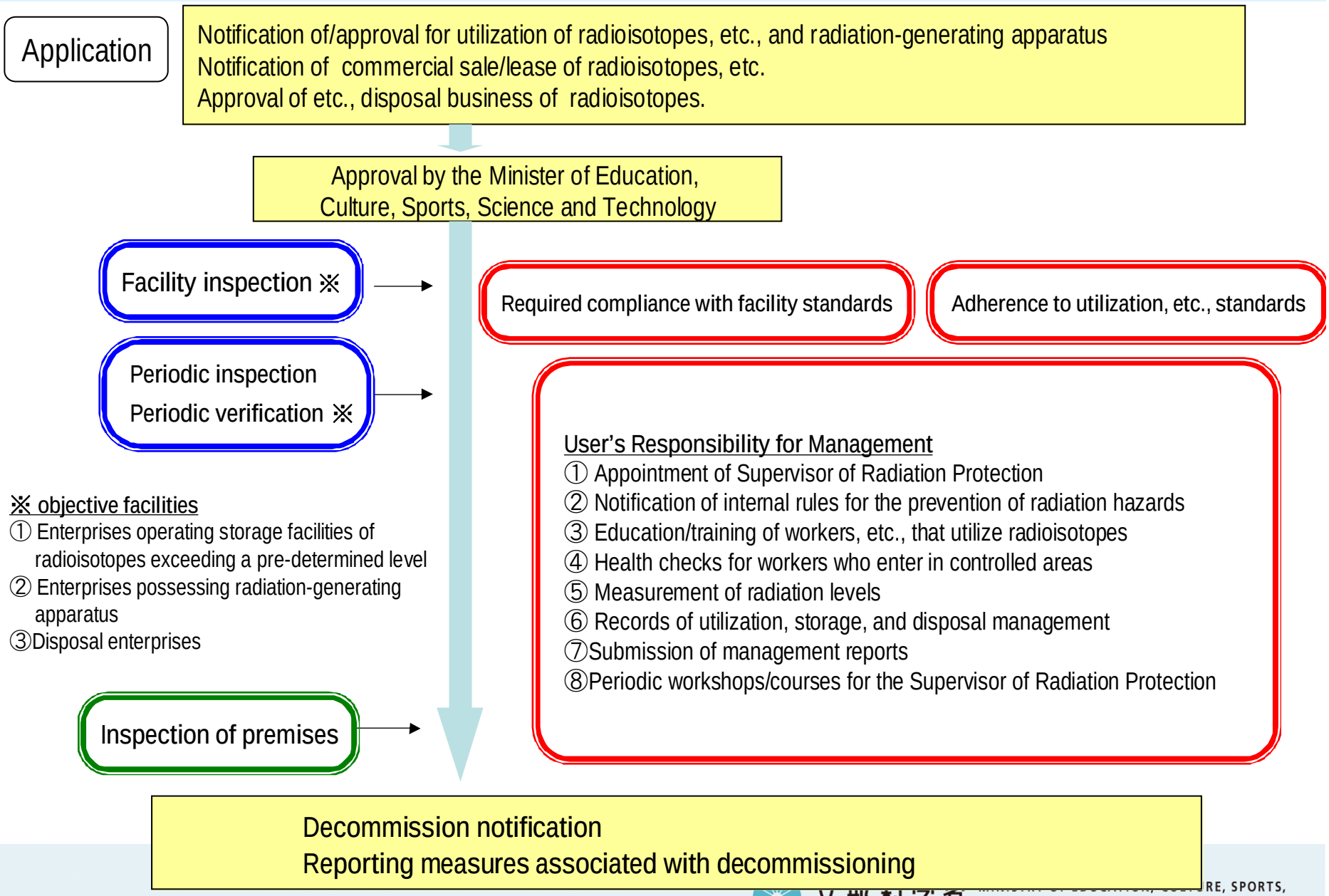
- The Special Committee on Safety Radioactive Waste and Decommissioning of NSC conducted investigations and deliberations aimed at establishing the clearance level of metallic radioactive waste derived through the conversion and enrichment of uranium and fabrication of uranium fuel. They compiled a report in October 2009.

Evaluation result of clearance level in NSC report

Nuclides to be evaluated	evaluation result (Bq/g)	IAEA (RS-G-1.7) (Bq/g)
U−232	0. 2	0. 1
U−234	1. 5	1
U−235	1. 4	1
U−236	1. 7	10
U−238	1. 8	1

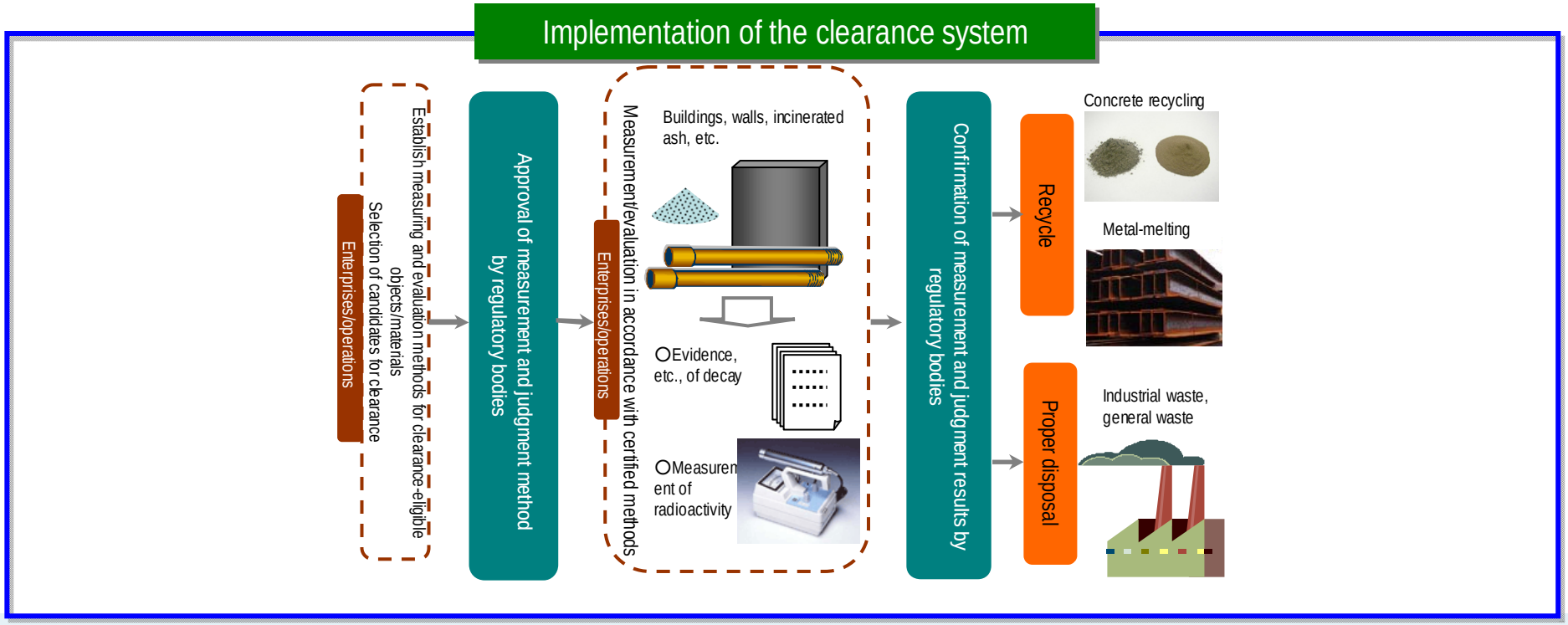
- To implement confirmation procedure in the clearance for uranium processing facilities that use nuclear fuel materials, MEXT is currently deliberating on the establishment, etc., of clearance levels through the technical WG discussion of the Subcommittee on Safety Regulations for Research Reactors. Completion of their report is scheduled in FY2009, and amendments to ordinances are planned thereafter.

4-1. Regulations based on the Radiation Hazards Protection Law

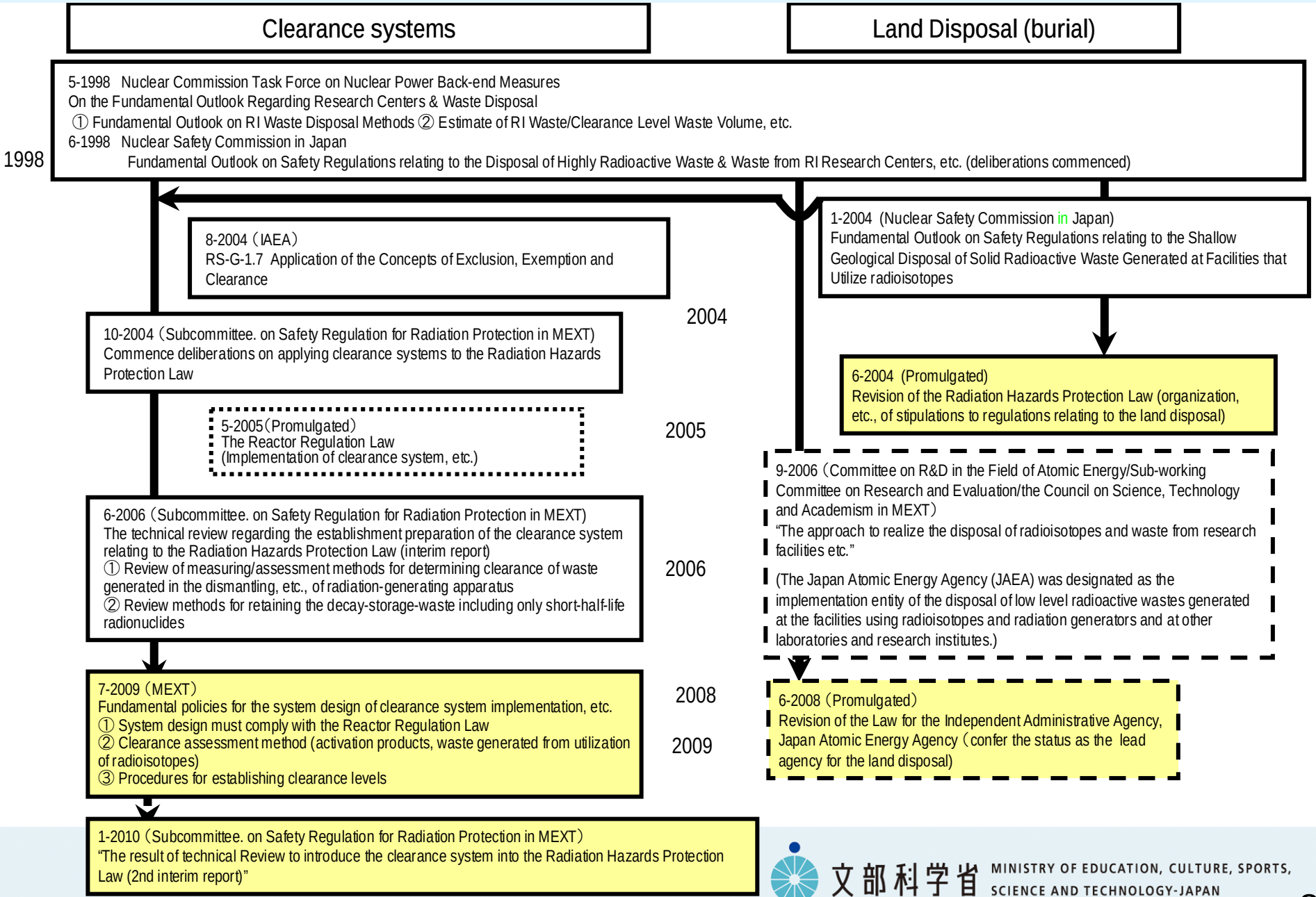


4-2. Consideration to establish the Clearance system in the Radiation Hazards Protection Law

● Approx. 250,000※ radioactive waste materials will be regulated under the Radiation Hazards Protection Law (as of March 31 in 2009; 200-liter drum equivalents). Approx. 50% of them are low-level radiation materials even compared to natural radiation. Establishment of the clearance system in the Radiation Hazards Protection Law contributes to the reduction of the cost of the radioactive waste disposal, and it facilitate reasonable usage of radioisotopes and radiation generating apparatus in the research, industrial and medical fields.



4-3. Background of the Review Process for Clearance Systems & Land Disposal



Outline of "the result of technical Review to introduce the clearance system into the Radiation Hazards Protection Law (2nd interim report)" (Subcommittee. on Safety Regulation for Radiation Protection & MEXT: compiled on January 2010.)

【Content and result of technical review】

1. Calculation of the clearance level for contaminated materials with RI & activation products

① Concept of calculating the clearance level

With regard to the main RI radionuclides in contaminated materials with RI & activation products, basically with the method used by NSC to evaluate clearance level for nuclear reactor facilities, those radioactivity concentration (Bq/g) were evaluated, which were equivalent to the value that the critical group will be exposed to dose rate of 0.01 mSv/y, when metal and combustibles (ashes/cinders) are disposed in land on recycled after their clearance.

② Calculation procedure of the clearance level

- The amount of wastes which are assumed to be below the concentration shown in the IAEA Safety Guide, RS-G-1.7, were estimated based on the result of investigation concerning the use of the radioisotopes and radiation generating apparatus in Japan.
- Taking account of the result of investigation concerning the use of the radioisotopes and radiation generating apparatus in Japan, 53 and 34 radionuclides were selected for calculating the clearance level for radioactive wastes and activation products respectively.
- Evaluation routes, calculation models and evaluation parameters for the calculation of clearance level in the case of land disposal and recycling of concrete and metal were selected on the basis of the method considered at the Nuclear Safety Commission of Japan. In the case of land disposal and recycling of combustibles, recently they were also considered in the subcommittee.

③ Evaluated tentative values for the clearance level, comparison of the tentative values with the reference values for RS-G-1.7's exemption level on each radionuclide

- The tentative values of the clearance level on 53 radionuclides for radioactive wastes and 34 radionuclides for activation products were calculated by means of procedure described above.
- The tentative values were compared with the reference values of IAEA.
- As a result of above comparison, those tentative values were nearly same with the reference values in IAEA RS-G-1.7. Therefore, it was concluded that the IAEA RS-G-1.7's exemption level can be adopted at the clearance level in the Radiation Hazards Protection Law.

②Consideration on regulation of activation products produced by using the radiation generating apparatus

The concept of the regulation of activation products produced by the radiation generating apparatus (the linear accelerator for radiotherapy, and the medical compact cyclotron to produce radioisotope for the positron emission tomography) for medical use was considered on the basis of the investigation result on the relationship between the maximum X-ray energy of the apparatus and the occurrence of activation reactions in the parts installed in the apparatus.

ME of X-ray	The result of investigation on activation products produced by using the linear accelerator	Future issues on activation products
ME ≦ 6MeV	There was no activation products.	
6MeV＜ ME ≦10MeV	Small amount of activation products in the target and in the few parts around the target. These are regulated under the clearance system or managed as low-level radioactive waste.	・To evaluate the threshold of the maximum X-ray energy causing activation products in the target. ・To consider the categorization of the structure and component without activation products except for target.
10MeV ＜ ME	Obviously activation products in the target and in the parts around it.	・To investigate activated area around the target. ・To categorize the concrete in radiotherapy room as the component without activation products.

③ Methods for continuation of objective materials for clearance.

○ Evaluation methods used in the clearance procedure under the Reactor Regulation Law can be applied to the clearance procedure for radioactive products produced by use of radiation generating apparatus.

○ The methods to evaluate the activity concentration of radioactive waste in the combustibles (ashes/cinders) was studied on the basis of the methods used in the clearance procedure for nuclear reactors.

◎ Further investigation：

+ Measurement of the concentration and evaluation of the unit, + Requirement of uniformity of concentration, + Selection of representative radionuclides, + Response to mixture of radionuclides (e.g. nuclides difficulties of radiation measurement, short half-life nuclide), + Clearance considering the decay of nuclides with short half-life.

4-3. General Administrative Group of the Radiation Council of Japan

Outline of “Basic Concept for Radiation Protection relating to Land Disposal of Solid Radioactive Waste and Clearance (compiled on January 2010)”

1　Dose criteria for public exposure for optimization of radiation protection

○ Dose limit for public exposure to radiation from burial ground of solid radioactive Waste

→ 1mSv/year

○ Dose constraint for public exposure to radiation from burial area of solid radioactive waste after the period for active control.

→ an upper bound of 300 μSv/year

It is necessary to optimize of radiation protection for any dose that may affect the exposure to the general public resulting from disposed waste after the period for active control at the stage of planning of disposal facilities.It is estimated that only few nuclear facilities may affect the exposure to the general public .

It is appropriate that 300 μ Sv/year for dose constraint to guarantee public exposure of less than 1mSv/year, by refering to refer to the standards of the International Commission on Radiological Protection (ICRP) .

4-3. General Administrative Group of the Radiation Council of Japan

2． Dose criteria for potential exposure by radioactive waste of long-lived radionuclide

1) Dose criteria applicable to normal exposure situations in natural process

- Dose assessment is applied to a disaggregated dose/probability approach.
- Likely, or representative, release scenarios are identified and the evaluated doses from these scenarios are compared with the dose constraint (an upper bound of 300 μ Sv/year).

2) Dose criterion that nearby population might be exposed through accidental human intrusion into burial area in the future

→ an upper bound of 20 mSv/year

3． Individual dose criterion for clearance

→ 10 μ Sv/year