Ordinance on Prevention of Ionizing Radiation Hazards

(Ministry of Labour Ordinance No. 41, 30 September 1972)

Latest Amendments:

Ministry of Health, Labour and Welfare Ordinance No. 89 of 8 July 2013

Pursuant to the provisions from the Industrial Safety and Health Act (Act No. 57 of 1972) and the Order for Enforcement of Industrial Safety and Health Act (Cabinet Order No. 318 of 1972), and in order to implement the said Act, Ordinance on Prevention of Ionizing Radiation Hazards shall be provided as follows.

Chapter 1 General Provisions (Articles 1, 2)

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Section 1 Prevention of Contamination Caused by Radioactive Materials (Except Radioactive Materials Discharged by the Nuclear Power Plant Accident) (Articles 22 to 41-2)

Section 2 Prevention of Contamination Caused by Radioactive Materials Discharged by the Nuclear Power Plant Accident (Articles 41-3 to 41-10)

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Supplementary Provisions

Chapter 1 General Provisions

(Basic Principle of Prevention of Ionizing Radiation Hazards)

Article 1.

Employers shall endeavor to minimize the exposure of workers to ionizing radiation as low as possible.

(Definitions)

Article 2.

"Ionizing radiation" (hereafter called "radiation") as set forth by this Ordinance shall be defined as the following particulate rays and electromagnetic waves:

(1) Alpha-rays, deuteron-rays and proton-rays

(2) Beta-rays and electron-rays

(3) Neutron-rays

(4) Gamma-rays and X-rays

2. In this Ordinance, "radioactive materials" shall be defined as radioactive isotopes (hereinafter referred to as "radioisotopes"), their compounds and the materials containing the radioisotopes which fall under any one of the following categories:

(1) Radioactive materials with one radioisotope falling within one of the radioisotopes given in the first column of Attached Table 1 with a quantity and concentration equal to or exceeding those given in the second and third columns of the same table, respectively, corresponding to the radioisotope type concerned.

(2) Radioactive materials with one radioisotope falling within one of the radioisotopes given in the first column of Attached Table 2 with a quantity of equal to or exceeding that given in the second column of the same table, corresponding to the radioisotope type concerned. However, any solid material with a concentration of 74 Bq per gram or less and any sealed material with a quantity of 3.7 MBq or less shall be excluded.

(3) In the case of radioactive materials comprising two or more radioisotopes that are given in the first column of Attached Table 1, those falling under all of the following:

a) Those for which the sum of the ratio of the quantity of each radioisotope given in the first column of Attached Table 1 to the quantity given in the corresponding second column of the same table exceeds 1.

b) Those for which the sum of the ratio of the concentration of each radioisotope given in the first column of Attached Table 1 to the concentration given in the corresponding third column of the same table exceeds 1.

(4) In the case of radioactive materials comprising two or more radioisotopes not falling under the preceding item, those for which the sum of the ratio of the quantity of each radioisotope given in the first column of Attached Table 1 or Table 2 to the quantity given in the corresponding second column of Attached Table 1 or Table 2 exceeds 1. However, any solid material with a concentration of 74 Bq per gram or less and any sealed material with a quantity of 3.7 MBq or less shall be excluded.

3. In this Ordinance, "radiation works" shall mean those listed in Attached Table 2 of the Enforcement Order of the Industrial Safety and Health Act (hereafter referred to as the "Cabinet Order") (the radiation works other than those provided for by Article 59-2 shall not include works of decontamination of soil, etc. provided for by Item 1 of Paragraph 7 of Article 2, works for collecting wastes, etc. provided for by Item 2 of the said Article, and works for handling designated contaminated soil and wastes provided for by Item 3 of the said Paragraph of the Ordinance on Prevention of Ionizing Radiation Hazards for Works to Decontaminate Soil and Wastes Contaminated by Radioactive Materials Resulting from the Great East Japan Earthquake and Related Works (Ministry of Health, Labour and Welfare Ordinance No. 152, 2011, hereafter referred to as the "Ordinance for Decontamination").

4. The radioactive materials as established by the Ministry of Health, Labour and Welfare Ordinance based on Item 4 of Attached Table 2 of the Cabinet Order shall correspond to those provided in Paragraph 2.

Chapter 2 Controlled Areas, Exposure Dose Limits and Measurements

(Indications, etc. of the Controlled Areas)

Article 3.

Employers who operate businesses carrying out radiation works (hereinafter referred to as the "employer" except in the case of Article 62) shall demarcate those areas that fall under any of the following (hereinafter referred to as "controlled areas") by posting notices:

(1) Areas in which the total of the effective dose due to external radiation and the effective dose due to radioactive materials in the air may exceed 1.3 mSv per 3 months.

(2) Areas in which the surface density of radioactive materials may exceed one-tenth of the limits listed in the Attached Table 3.

2. The effective dose due to external radiation as prescribed in Item 1 of the preceding paragraph shall be calculated in the unit of 1 cm dose equivalent.

3. The effective dose due to radioactive materials in the air as prescribed in Item 1 of Paragraph 1 shall be calculated by multiplying 1.3 mSv by the equivalent of one-tenth of the average limit for three months as designated by the Minister of Health, Labour and Welfare of the average concentration of radioactive materials in the air during the working hours in a week (when working hours in a week exceed 40 hours or are less than 40 hours, the value used shall be obtained by multiplying the average concentration of radioactive materials in the air during the working hours in a week by the value obtained by dividing the said working hours by 40 hours; hereinafter referred to as the "weekly average concentration").

4. Employers shall not allow persons, other than those with a need to enter the controlled areas, to do so.

5. Employers shall post notices, at easily visible places in the controlled areas, concerning the requirements to wear the radiation measuring instrument specified in Paragraph 3 of Article 8, warnings concerning the handling of radioactive materials and the necessary emergency measures in the event of an accident, etc., to be taken to prevent health hazards to workers due to radiation.

(Limit of Radiation Exposure Dose in Facilities, etc.)

Article 3-2.

With respect to any radiation equipment rooms in Paragraph 1 of Article 15, work rooms for

handling radioactive materials in Paragraph 2 of Article 22, storage facilities in Paragraph 1 of Article 33 (including the applications to the cases of the provisions of Article 41-9), disposal-by-storage facilities in Paragraph 1 of Article 36, sites for handling accident-derived wastes and others in Paragraph 2 of Article 41-4 or landfill facilities in Paragraph 1 of Article 41-8, employers shall limit the total of the effective dose due to external radiation and the effective dose due to radioactive materials in the air as equivalent to 1 mSv or less per week, at such sites that are usually entered by workers, by installing shielding walls, protective screens or other shielding devices, or by installing a local exhaust ventilation system or equipment which seals the emission source of gas, vapor or dust of radioactive materials.

2. The provisions of Paragraph 2 of the preceding article shall apply mutatis mutandis to the calculation of the effective dose due to external radiation as prescribed in the preceding paragraph.

3. The effective dose due to radioactive materials in the air as prescribed in Paragraph 1 of this article shall be calculated by multiplying 1mSv by the ratio of the weekly average concentration to the limit designated by the Minister of Health, Labour and Welfare under the provisions of Paragraph 3 of the preceding article.

(Exposure Dose Limit for Radiation Workers)

Article 4.

Employers shall ensure that the effective dose received by workers engaged in radiation works in a controlled area (hereinafter referred to as "radiation workers") does not exceed 100 mSv per five years and 50 mSv per one year.

2. Regardless of the provisions in the preceding paragraph, employers shall ensure that the effective dose received by female radiation workers (excluding female workers who were diagnosed with no possibility of pregnancy and those specified in Article 6) does not exceed 5 mSv per three months.

Article 5.

Employers shall ensure that the equivalent dose of radiation workers does not exceed 150 mSv per one year for the eye lens and 500 mSv per one year for the skin.

Article 6.

Employers shall ensure that the dose received by female radiation workers who are diagnosed as

pregnant does not exceed the dose specified in the items in the following categories, starting from the time they are diagnosed as pregnant until delivery (hereinafter referred to as "pregnancy"):

(1) Effective dose due to internal exposure: 1 mSv

(2) Equivalent dose received on abdomen surface: 2 mSv

(Dose Limit in Emergency Works)

Article 7.

When carrying out emergency works to protect workers from health hazards due to radiation (hereinafter referred to as "emergency works") in the event of an accident that falls under any of the items of Paragraph 1 of Article 42, and in which an area as prescribed in the said Paragraph is generated, notwithstanding the provisions of Paragraph 1 of Article 4, and of Article 5, the employer may allow male radiation workers and female radiation workers who were diagnosed with no possibility of pregnancy to be exposed to doses that exceed the limit prescribed in such paragraphs.

2. In the event of any procedures under the preceding paragraph, the exposure dose during any such emergency works shall not exceed the value set in the following items as prescribed for each of the classifications below.

(1) 100 mSv for the effective dose.

(2) 300 mSv for the equivalent dose exposure to the eye lens.

(3) 1 Sv for the equivalent dose exposure to the skin.

3. The provision of the preceding paragraph shall be applied mutatis mutandis to male workers and female workers who were diagnosed with no possibility of pregnancy who engage in emergency works except radiation workers.

(Dose Measurements)

Article 8.

Employers shall measure the doses due to external and internal exposures received by radiation workers, emergency workers and workers who enter the controlled area temporarily, in the controlled area.

2. The dose due to external exposure provided for in the preceding paragraph shall be measured with the units of 1 cm dose equivalent and 70 μm dose equivalent (in the case of neutron-rays, 1 cm dose equivalent). However, in accordance with the provisions of the following paragraph, the measurement carried out using a radiation measuring instrument attached to the parts of the body specified in Item 3 of the following paragraph shall be made with the unit of 70 μm dose

equivalent.

3. The dose due to external exposure provided for in Paragraph 1 shall be measured by attaching a radiation measuring instrument to the parts of the body designated in the following items. The dose, however, may be calculated based on the dose equivalent rate measured by a radiation measuring instrument when dose measurement using a radiation measuring instrument is extremely difficult, and the dose may be determined by calculation when the application of the alternative method is also extremely difficult.
   (1) The chest for male workers and female workers who were diagnosed with no possibility of pregnancy, and the abdominal area for other female workers.
   (2) The part most likely to be exposed to radiation among the head, neck, chest, upper arm, abdominal area and thigh (excluding cases where the parts most likely to be exposed to radiation for male workers and female workers who were diagnosed with no possibility of pregnancy are the chest and upper arm, and cases where the parts most likely to be exposed to radiation for other female workers are the abdominal area and the thigh).
   (3) The part most likely to be exposed to radiation (excluding the case of neutron-rays), if such part is other than the head, neck, chest, upper arm, abdominal area and thigh.

4. The dose due to internal exposure under the provisions of Paragraph 1 shall be measured at least quarterly for workers who enter sections of a controlled area where there is a possibility of taking in radioactive materials either by inhalation or ingestion (at least monthly for female workers whose effective dose exposure may exceed 1.7 mSv in any single month (except for female workers who were diagnosed with no possibility of pregnancy) and female workers during pregnancy). However, in cases where a radiation worker mistakenly inhales or ingests radioactive materials, the measurement shall be conducted immediately after such ingestion or inhalation.

5. In measuring the dose due to internal exposure under the provisions of Paragraph 1, the measured value shall be determined using the method provided by the Minister of Health, Labour and Welfare.

6. Radiation workers, emergency workers and workers who enter the controlled area temporarily shall wear radiation measuring instruments in the controlled area, with the exception of cases coming under the proviso to Paragraph 3.

(Confirmation, Recording, etc. of Dose Measurement Results)

Article 9.

Employers shall confirm the results of the measurement of the dose due to external exposure under the provisions of Paragraph 1 of the preceding article daily for workers who are likely to be exposed to radiation exceeding 1 mSv per day in the unit of 1 cm dose equivalent.

2. Employers shall calculate and record the dose for radiation workers listed in each of the following items without delay by using the methods provided by the Minister of Health, Labour and Welfare on the basis of the measurement and/or calculation results under the provisions of Paragraphs 3 or 5 of the preceding article, and keep such records for 30 years. This provision shall not apply in the event that an employer turns over such records to an organization designated by the Minister of Health, Labour and Welfare after keeping them for a period of five years.
   (1) Quarterly, annual and five-year totals of the effective dose for male workers and female workers who were diagnosed with no possibility of pregnancy (quarterly and annual totals of the effective dose for workers whose effective dose did not exceed 20m Sv/year in the past five years).
   (2) Monthly, quarterly and annual totals of the effective dose for female workers (except female workers who were diagnosed with no possibility of pregnancy) (quarterly and annual totals of the effective dose for workers whose effective dose is unlikely to exceed 1.7 mSv per month).
   (3) Quarterly and annual totals of the tissue dose equivalents by human tissue.
   (4) Monthly and the during-pregnancy totals of the effective dose due to internal exposure and the equivalent dose exposure to the abdomen surface of female workers during pregnancy.

3. Employers shall, without delay, inform each radiation worker of the dose specified in each item of the preceding paragraph based on the records under the provisions of the preceding paragraph.

Chapter 3 Protection against External Radiation

(Cylinders for Irradiation, etc.)

Article 10.

When an employer uses X-ray equipment, as listed in Item 22 of Paragraph 3 of Article 13, of the Cabinet Order (hereafter called “specified X-ray equipment”) of those (which generate X-rays, and correspond to those other than X-ray equipment as provided by Item 2 of Attached Table 2 of the Cabinet Order, the same as in the following), he shall use the irradiation cylinder or diaphragm by which the vertical angles of the irradiation areas in the form of a cone in which X-rays are collected at its apex are made narrower than the angles necessary for actual irradiation for carrying out of radiation work, provided that this does not apply in respect to the case in which the use of the said irradiation cylinder or diaphragm may prevent the said specified X-ray equipment from being properly employed for adequate irradiation.

2. The employer shall ensure the irradiation cylinders and diaphragm provided by the preceding paragraph conform to the standards established by the Minister of Health, Labour and Welfare.

(Filters)

Article 11.

When the employer uses specified X-ray equipment, he shall select filters for use in it, provided that this does not apply in respect to a case in which the use of soft X-rays is required owing to the nature of the work, or a case in which there is no possibility that workers who engage in the said work may be subjected to soft X-rays.

(Measures for Fluorography)

Article 12.

In carrying out fluorography by using specified X-ray equipment, the employer shall take the following measures. However, this shall not apply in the case of using specified X-ray equipment that has a shielding structure, so that the whole or part of the body of the worker engaged in fluorography work does not enter the exposure field during X-ray irradiation.

(1) With respect to the distance between the X-ray tube and the focal receiving equipment used, the X-ray radiation field shall not exceed the reception area.

(2) For fluorography X-ray equipment for mass chest fluorography and specified X-ray equipment other than for medical use (hereinafter referred to as "industrial use"), the primary protection shield of the receiving equipment shall limit the free-air air-kerma at a distance of 17 cm from the possible contact surfaces of the equipment (referred to as the

"air-kerma" in the next item) to 1.0 microgray or less per scan.

(3) For fluorography X-ray equipment for mass chest fluorography and specified X-ray equipment for industrial use, box-shaped shielding shall be installed surrounding the irradiated object, and the air-kerma at a distance of 10 cm from the shielding shall be 1.0 microgray or less per scan.

2. Notwithstanding the provisions of the preceding paragraph, the employer may not take the measures listed for any of the following items.

(1) The measure specified in Item 1 of the preceding paragraph in the case when an X-ray radiation field does not exceed the size which circumscribes the reception area at the distance between the X-ray tube and the focal receiving equipment used, in the case where the reception area is circular and the X-ray radiation field is rectangular.

(2) For specified medical X-ray equipment, the measure specified in Item 1 of the preceding paragraph, assuming two straight lines perpendicularly intersect at the reception area that is vertical to the irradiation direction, in the case where the sum of the distances between intersections that each line crosses the edge of the X-ray radiation field and the edge of the reception area (hereafter referred to as a distance between intersection points in this paragraph and Item 3, paragraph 2 of the subsequent article) does not exceed 3% of the distance between the X-ray tube and the focal receiving equipment used as well as the sum of the distances between intersection points of two lines does not exceed 4% of the distance between the X-ray tube and the focal receiving equipment used.

(3) Pursuant to the provisions of the conditional clause in Paragraph 1 of Article 15, measures specified in Items 2 and 3 of the preceding paragraph in case of using specified X-ray equipment at places other than a radiation equipment room.

(4) Measures specified in Item 3 of the preceding paragraph in the event any worker engaged in fluorography work can easily be evacuated to a site as prescribed in Paragraph 1 of Article 3-2.

(Measures for Direct Radioscopy)

Article 13.

In carrying out direct radioscopy by using specified X-ray equipment, the employer shall take the following measures. However, this shall not apply in the case of using specified X-ray equipment that has a shielding structure so that the whole or part of the body of the worker engaged in the work of direct radioscopy does not enter the exposure field during X-ray irradiation.

(1) The installation of equipment that makes it possible for the worker engaged in direct

radioscopy to stop the generation of X-rays, or be shielded from the same, from the present position of the operator.

(2) The installation of an automatic device that will immediately open the X-ray tube circuit in the event the current to the X-ray tube exceeds twice the rated current for the tube.

(3) With respect to the distance between the X-ray tube and the focal receiving equipment used, the X-ray radiation field shall not exceed the reception area.

(4) The air-kerma rate in the air of X-rays that pass the receiving equipment in the cone (hereinafter referred to as the "air-kerma rate") shall be limited to 150 microgray/h or less at a distance of 10 cm from all possible contact surfaces of the receiving equipment in the cone in the case of specified X-ray equipment for medical use, and to 17.4 microgray/h or less at a distance of 1 m from the focal point of the X-ray tube with respect to specified X-ray equipment for industrial use, etc.

(5) The air-kerma rate of the X-rays that pass any section that exceeds 3.0 cm from the maximum irradiation field at the time of direct radioscopy shall be limited to 150 microgray/h or less at a distance of 10 cm from all possible contact surfaces of the same section with respect to specified X-ray equipment for medical use, and to 17.4 microgray/h or less at a distance of 1 m from the focal point of the X-ray tube with respect to specified X-ray equipment for industrial use, etc.

(6) The installation of appropriate equipment to effectively shield any surface surrounding the irradiated object from other X-rays emanating from the cone.

2. Notwithstanding the provisions of the preceding paragraph, the employer may not take any of the following measures with respect to any of the situations described below.

(1) Measures prescribed under Item 2 of the preceding paragraph in the event of installing a timer that keeps a running total of elapsed radioscopy time and issues a warning sound, etc., when a given length of time is exceeded during radioscopy with respect to specified X-ray equipment for medical use.

(2) The measure specified in Item 3 of the preceding paragraph in the case when an X-ray radiation field does not exceed the size which circumscribes the reception area at the distance between the X-ray tube and the focal receiving equipment used, in the case where the reception area is circular and the X-ray radiation field is rectangular.

(3) For specified medical X-ray equipment, the measure specified in Item 3 of the preceding paragraph, assuming two straight lines perpendicularly intersect at the reception area that is vertical to the irradiation direction, in the case where the sum of the distance between intersection points does not exceed 3% of the distance between the X-ray tube and the focal receiving equipment used as well as the sum of the distance between intersection

points of two lines does not exceed 4% of the distance between the X-ray tube and the focal receiving equipment used.

(4) Under the provisions of the conditional clause in Paragraph 1 of Article 15, measures specified in Items 4 through 6 of the preceding paragraph in the event of using any specified X-ray equipment at places other than a radiation equipment room.

(Posting of Notices)

Article 14.

The employer shall prepare notices for the equipment or the machines listed in the left column of the following table to indicate the matters correspondingly listed in the right column of the same table according to their classifications and post each of such notices on or near the corresponding equipment or machine where the notice can be seen easily.

Machines or equipment	Items to be indicated
Cyclotrons, betatrons, and other machines to accelerate charged particles (hereafter called charged particle accelerators).	Types of machines, types of rays, and maximum energy.
Equipment loaded with radioactive materials（excluding the following items）	Types of equipment, types and quantities of radioisotopes contained in radioactive materials loaded in the said equipment (in units of Becquerel), date on which the said radioactive materials were loaded in the equipment, name of the owner of the equipment.
Certified apparatuses with indication set forth in Paragraph 2 of Article 12-5 of the Act on Prevention of Radiation Health Impairment Due to Radioisotopes, etc. [Act No. 167 of 1957] or specified certified apparatuses with indication set forth in Paragraph 3 of the said Article (excluding those used for changing or cleaning radioactive sources to be used in these apparatuses), among those apparatuses loaded with radioactive materials.	Types of equipment, and types and quantities of radioisotopes contained in the radioactive materials loaded in the said apparatuses (in units of Becquerel)

(Radiation Equipment Room)

Article 15.

The employer intending to install the equipment or the machines listed hereunder (hereinafter referred to as "radiation equipment") shall provide an exclusive room (hereinafter referred to as "radiation equipment room") for their installation except in the cases where the radiation equipment

to be installed is covered with a shield capable of restricting the 1 cm dose equivalent rate due to external radiation to 20 μ Sv/hour or less at the outside, where the radiation equipment has to be moved from one place to another for use and where installing the radiation equipment as stationary in an exclusive room severely hinders the effective use of the equipment or causes substantial inconvenience for the operator of the equipment.

(1) X-ray equipment.
(2) Charged particle accelerators.
(3) Equipment for removing gases from X-ray tubes or kenotrons, or for inspecting these devices from which X-rays are generated.
(4) Equipment loaded with radioactive materials.

2. The employer shall put up notices which indicate the radiation equipment room at the entrance of the said rooms.

3. The provision of Paragraph 4 of Article 3 shall be applied with necessary modification to the radiation equipment room.

（Shielding Structure）

Article 16.

Deleted

(Warning Devices, etc.)

Article 17.

In the events listed hereunder, the employer shall notify the persons concerned to that effect. In notifying the said events, however, the notification shall be made by means of an automatic alarm system except in the cases where the radiation equipment has to be used in any place other than the radiation equipment room, where the X-ray equipment with the tube voltage of 150 kV or less is to be used and where the radiation equipment to be used is loaded with radioactive materials of less than 400 GBq in quantity.

(1) When the power is supplied to the X-ray equipment or charged particle accelerator.
(2) When the power is supplied to testing equipment for removing gases from X-ray tubes or kenotrons, or for inspecting these devices.
(3) When radiation equipment loaded with radioactive materials is in operation to emit the radiation.

2. The employer shall install an interlock to the entrance, which persons regularly enter from, to

the radiation equipment room where the charged particle accelerator or the equipment loaded with radioactive materials of more than 100 TBq is installed.

(Entry Prohibited)

Article 18.

When the X-ray equipment (restricted to that for fluorography in the case of medical X-ray equipment) or the equipment loaded with radioactive materials has to be used at any place other than the radiation equipment room, conforming to the proviso of Paragraph 1 of Article 15, the employer shall prohibit workers from entering within 5 m from the focal point of the X-ray tube or the radiation source (not including places where the effective dose due to external radiation is 1 mSv/week or less) except in the cases of the entries of the workers for the preparatory work for removing the radiation source from the radiation source container, inspection of the radiation source and other necessary work, providing that the radiation source is securely contained in the radiation source container where the radiation source container, and the shutters, if provided in the said container, have closed.

2. The provisions of the preceding paragraph shall apply mutatis mutandis to cases in which the employer uses medical-use X-ray equipment for X-ray photography at places other than a radiation equipment room. In such a case, the term "5 m" in the paragraph shall be read as "2 m."

3. The provisions of Paragraph 2 of Article 3 shall apply mutatis mutandis to the calculation of the effective dose due to external radiation as prescribed in Paragraph 1 (including cases in which the provisions of the preceding paragraph are applied; the same shall also apply in the case of the following paragraph).

4. The employer shall put up notices which state the prohibition or stop the workers from entering into places in accordance with the provision of Paragraph 1, at the places concerned or in their vicinity.

(Measures for Transmissive Photography)

Article 18-2.

When the employer uses specified X-ray equipment or gamma-ray radiation equipment for transmissive photography (which correspond to the ones used for transmissive photography, the same as in the following) at the places other than the radiation equipment room (excluding the case in which there is no possibility that the workers are exposed to radiation) in compliance with the

proviso of Paragraph 1 of Article 15, the radiation shall be emitted in a direction other than that which the said workers enter, or measures shall be taken by which the X-rays for the said radiation are shielded.

(Taking out of Radiation Sources, etc.)

Article 18-3.

When the employer uses gamma-ray radiation equipment for transmissive photography, he shall not take radiation sources out of the radiation source containers unless he uses source carrier devices (composed of operation devices (wire-release devices which extend and wrap up wires), operation tubes (tubes into which the wire-releases are guided) and also transmission tubes (tubes into which the radiation sources and wire-releases are guided, same as hereinafter) to take the radiation sources out of the containers and to place the radiation sources in the said containers, same as hereinafter).

2. Notwithstanding the provision of the preceding paragraph, the employer may take out the radiation source from the container using a remote controller other than the radiation source carrier devices when using gamma-ray radiation equipment for transmissive photography inside the radiation equipment room.

Article 18-4.

When the employer uses gamma-ray radiation equipment for transmissive photography with the source carrier devices, he shall comply with the provisions as given below.

(1) The movement of the said transmission tubes shall be made after the radiation sources have been placed securely in the said radiation source containers, and after the shutters, if provided in the said radiation source containers, have closed properly.

(2) The employer shall make the angles of the apex of the cone formed by X-rays radiated narrower than those necessary for the purpose of the actual radiation with the said equipment, and make the air-kerma rate of gamma-rays, which are radiated covering areas other than those covered by the said cone, minimized by means of collimators, etc., provided that this does not apply in respect to the case in which the purposes or aims of the said equipment are markedly hindered when using the said collimators, etc.

(Periodical Voluntary Inspections)

Article 18-5.

The employer shall make voluntary inspections of gamma-ray radiation equipment for transmissive photography periodically at least once a month in terms of the items as given below; however, with respect to the case in which the said equipment has not been used for periods of time which are

longer than a month, the inspections are not required for the said period of time.

(1) The presence or absence of abnormalities in the shutters of the radiation source container and devices thereby to open and shut the said containers.

(2) The presence or absence of abnormalities in the devices thereby to fasten the holder of the radiation sources.

(3) For those that have source carrier devices, the presence or absence of abnormalities in the connecting portion between said devices and the radiation source container.

(4) The presence or absence of abnormalities in the source carrier devices and in the remote-control devices thereby to adjust the locations of radiation sources, if provided.

2. The employer shall make voluntary inspections of the equipment, as set forth in the proviso of the preceding paragraph in terms of each of the items of the same paragraph, before resuming the use of this equipment.

Article 18-6.

The employer shall make voluntary inspections of the gamma-ray radiation equipment used for transmissive photography periodically at least once every six months in terms of the presence or absence of abnormalities in the performance thereby to shield the radiation source containers; however, with respect to the case in which the said equipment has not been used for periods of time which are longer than six months, the inspections are not required for the said periods of time.

2. The employer shall make voluntary inspections of the equipment as set forth in the proviso of preceding paragraph in terms of the presence or absence of abnormalities in the performance thereby to shield radiation source containers before resuming the use of this equipment.

(Records)

Article 18-7.

When the employer carries out voluntary inspections as stated in the preceding two articles, he shall record the items as given below and shall keep the records in his custody for the period of three years.

(1) Date of inspection.

(2) Method of inspection.

(3) Parts of equipment inspected.

(4) Results of inspection.

(5) Names of persons who carry out the inspection.

(6) The contents of measures such as repair, etc., if taken on the basis of the results of the said

inspections.

(Checkup)

Article 18-8.

When the employer first uses gamma-ray radiation equipment for transmissive photography, when the employer repairs or improves the said equipment after the said equipment has been dismantled, or when the employer replaces previous radiation sources by new ones, he shall carry out a checkup on the terms of each item of Paragraph 1 of Article 18-5 and of the presence or absence of abnormalities in the performance thereby to shield the radiation source containers.

(Repairs, etc.)

Article 18-9.

When the employer has made periodic voluntary inspections as provided by Article 18-5 or Article 18-6 or a checkup as set forth in the preceding article, he shall quickly make repairs of abnormalities, if found, or assume other measures for countering the abnormalities.

(Placement of Radiation Sources)

Article 18-10.

When the employer has workers engage in work to place the radiation sources into their containers or into other containers in the case in which there occur accidents as set forth in Item 4 of Paragraph 1 of Article 42, he shall assume measures thereby to shield the said radiation sources and shall also have the workers use forceps, etc., to provide proper distance between the said workers and the radiation sources.

(Checking of Radiation Sources)

Article 19.

When the employer uses the equipment provided with radioactive materials by moving them, he shall make a check, using radiation measuring instruments, in terms of whether the radiation source has been lost or is missing, leaking out, or spilling out, and also of whether the radiation source is securely placed in the radiation source containers, if provided in the said devices, and also of whether the shutters, if provided in the radiation source containers, are securely closed immediately just after the said equipment has been used, and also when it is put into the storage place after the daily work.

2. In a case in which confirmation is made of a loss or missing, leakage or spilling of radiation sources, radiation sources not being placed securely in the radiation source containers, and the non-or half-closure of shutters of the radiation source containers, the employer shall look for

the lost or missing radiation sources, repair the said containers, or assume measures necessary for prevention of health impairment of the workers concerned.

Article 20.

Deleted

Article 21.

Deleted

Chapter 4 Prevention of Contamination

Section 1 Prevention of Contamination Caused by Radioactive Materials (Except Radioactive Materials Discharged by the Nuclear Power Plant Accident)

(Work Rooms for Handling Radioactive Materials)

Article 22.

When the employer (excluding the disposal operator provided for by Article 41-3; the same shall apply hereafter in this section) handles radioactive materials which are not tightly closed, he shall provide a work room used exclusively for the handling of the said radioactive materials, and shall handle the said radioactive materials in the said room, provided that this does not apply in respect to a case in which use is made of radioactive materials by distributing or moving the said radioactive materials in extensive areas for carrying out of investigations into water leakage, epidemiological investigations with insects, investigations into moving statuses in the manufacturing processes of raw materials, etc., and in which use as specified above is temporary, or a case in which mining is made of nuclear raw materials (nuclear raw materials shall be defined as those provided for by Item 3 of Article 3 of the Atomic Energy Basic Law (Law No. 186, 1955), the same as in the following).

2. The provisions of Paragraph 4 of Article 3 and Paragraph 2 of Article 15 shall be applied with necessary modification to the work room where radioactive materials are handled (meaning the work room defined in the preceding paragraph and the exclusive passage for the workers to engage in the work defined in provision of the said Paragraph, the same as in the following)

(Structures of Work Rooms for Handling Radioactive Materials)

Article 23.

In terms of the portions which may be contaminated with radioactive materials, comprising walls, floors, etc., in the inside of the said work rooms therein to handle radioactive materials, the employer shall provide the said walls, floors, etc., in a structure as provided below:

(1) The walls, floors, etc., shall be made of materials which are extremely resistant to permeation by gas or fluid, and also which are corrosion-proof.
(2) The said walls, floors, etc., shall have smoothly finished surfaces.
(3) The walls, floors, etc., shall be in a structure in which the said walls, floors, etc., have only the minimum necessary number of concave-convex portions, and crevices.

(Concentrations of Radioactive Materials in the Air)

Article 24.

The employer whose employees engage in the mining of nuclear raw materials in mines shall control the average of the weekly averages of the concentration of such materials in three months to the level or lower than the level designated by the Minister of Health, Labour and Welfare under Paragraph 3 of Article 3.

Article 25.

Employers shall control the three-month average of the weekly average concentration in workplaces other than the work rooms for handling radioactive materials and/or workplaces for mining of nuclear raw materials in mines to one-tenth or less of the limit designated by the Minister of Health, Labour and Welfare under Paragraph 3 of Article 3.

(Equipment to Prevent Dispersion of Radioactive Materials)

Article 26.

When there may occur a case in which dispersion occurs of spray or powder of radioactive materials resulting from handling of the said radioactive materials, the employer shall install or provide facilities with boards, curtains, etc., thereby to prevent the said spray or powder of radioactive materials from adhering to the bodies of workers, or clothing, footwear, work clothes, personal protective equipment, etc., which the said workers wear (hereafter called "equipment worn"), provided that this does not apply in respect to a case in which installation of the said facilities is extremely difficult resulting from the conditions under which the said work is being carried out and also a case in which the employer has the said workers concerned wear personal protective equipment as provided for by Paragraph 1 of Article 39.

(Tools to Handle Radioactive Materials)

Article 27.

For tools such as forceps, tweezers, etc., to be used in handling of radioactive materials employers shall post a written notice stating such usage, and shall not use these tools for other purposes.

2. Employers shall, if not using the tools provided in the preceding paragraph, keep them in tool-storing hangers, trays, etc., which have a design structure and are made of materials allowing for easy removal of contamination.

(Measures to be Taken When Radioactive Materials Are Spilled, etc.)

Article 28.

When contamination occurs due to an accident such as spills of the radioactive materials, either in liquid or powder form, employers shall immediately take measures for preventing the spread of the

contamination, indicate the area with possible contamination by posting a warning notice and remove the contaminant until the level of the contamination becomes below the limit listed in the Attached Table 3 (or one tenth of the limit listed in the Attached Table 3 if the contamination occurred in the place other than work rooms for handling radioactive materials

(Contamination Inspection in Work rooms for Handling Radioactive Materials)

Article 29.

Employers shall inspect the ceiling, floor, walls, equipment, etc. (limited to the parts where the workers might touch) of the work rooms for handling radioactive materials at least monthly, and if the said objects are found to be contaminated to the levels exceeding the limits listed in the Attached Table 3, employers shall decontaminate the objects to or below the limits.

2. Employers shall, when cleaning the said objects as set forth in the preceding paragraph, use a method that does not cause dispersion of dust.

(Contamination Inspection of Contamination Removing Tools, etc.)

Article 30.

After conducting the decontamination or the cleaning for the objects designated in Article 28 or Paragraph 1 of the preceding article, employers shall inspect the tools used for decontamination or cleaning each time, and, if the tools are found to be contaminated to levels exceeding the limits listed in the Attached Table 3, employers shall prohibit the workers from using such tools until the contamination of the tools is reduced to the levels lower than those listed in the said Table.

2. Employers shall post a written notice which indicates that the tools are contaminated with radioactive materials at locations or places where the said tools are stored.

3. The provisions of Paragraph 2 of Article 27 shall apply mutatis mutandis to the tools as provided by Paragraph 1.

(Contamination Inspection of Workers Leaving Controlled Areas)

Article 31.

Employers shall provide a contamination inspection site at the exit of the controlled areas (where contamination may occur of the workers' bodies, their equipment worn and other items exceeding one tenth of the limits listed in the Attached Table 3; the same shall apply hereafter in this and the next articles) to inspect the contamination of those workers' bodies and their equipment worn who were engaged in work in the controlled areas and are to leave the said areas.

2. If the levels of the contamination of the workers' bodies and their equipment worn are found to exceed one tenth of the limits listed in the Attached Table 3 through the inspection of the preceding paragraph, employers shall not permit the contaminated workers to leave the controlled areas unless the workers go through the following measures at the contamination inspection site of the preceding paragraph:
   (1) Wash the body until the level of contamination is reduced to or less than one tenth of the limit designated in the Attached Table 3, if the body is contaminated.
   (2) Take off or remove any equipment worn from their bodies, if such equipment are contaminated.

3. In accordance with instructions as provided by the preceding paragraph, workers shall wash their bodies or take off or remove any equipment worn from their bodies.

(Inspection of Contamination of Items Taken from Controlled Areas)

Article 32.

For items to be taken from the controlled areas, employers shall inspect their status of contamination at the contamination inspection site as described in Paragraph 1 of the preceding article when taking out the items.

2. Neither employers nor employees shall take out those items found to be contaminated to the levels exceeding one tenth of the limit designated in the Attached Table 3 through the inspection conforming to the provisions of the preceding paragraph; except where the items are to be carried to the contamination removing facilities, the work rooms for handling radioactive materials, the storage facilities, the facilities for disposal and other controlled areas by using the containers as provided for by the text of Paragraph 1 of Article 37 or by taking measures for the proviso of the said Paragraph.

(Storage Facilities)

Article 33.

Employers shall store radioactive materials in storage facilities separated from the external surroundings and which are provided with a locking mechanism and other closing devices or tools at the parts leading to the outside of the said facilities, such as doors and covers, etc.

2. Employers shall post notices of the fact at easily visible places outside such storage facilities.

3. The provisions of Paragraph 4 of Article 3 shall apply mutatis mutandis to the storage facilities

set forth in Paragraph 1.

(Facilities for Exhausted Air or Liquids)

Article 34.

Employers shall, when dealing with exhausted air or liquids from the work rooms for handling radioactive materials, crushing equipment, or belt conveyors and other transportation equipment, storing or purifying the said exhausted air or liquids, conduct such work within a facility with a gas and liquid leak-tight structure and the facility shall be made of corrosion-resistant materials with low liquid permeability.

2. The provisions of Paragraph 2 of the preceding article shall apply mutatis mutandis to the facilities as set forth in the preceding paragraph.

(Incinerators)

Article 35.

Employers shall, when incinerating radioactive materials or any objects found to be contaminated to the level exceeding one tenth of the limit designated in the Attached Table 3 (hereinafter referred to as "contaminated objects"), use an incinerator in a structure which eliminates the possibility of gas leakage and spread of ashes.

2. The provisions of Paragraph 2 of Article 33 shall apply mutatis mutandis to the incinerators set forth in the preceding paragraph.

(Disposal-by-storage Facilities)

Article 36.

When the employer disposes radioactive materials or contaminated objects by storage, he shall do the said disposal-by-storage in the said facilities, separated from external circumstances, and also which are provided with a locking mechanism and other closing devices or tools at the portions which lead to the outside of the said facilities such as doors and covers, etc.

2. The provisions of Paragraph 4 of Article 3 and Paragraph 2 of Article 33 are respectively applicable with necessary modifications to the disposal-by-storage facilities set forth in the preceding paragraph.

(Containers)

Article 37.

Employers shall use containers when storing or keeping radioactive materials, or when carrying, temporarily storing before disposal or conducting landfill operations of radioactive materials or contaminated objects; provided, that this does not apply to a case in which it is extremely difficult to put these materials in containers, and effective measures are taken to shield the leakage of radiation to the outside or to prevent spread of contamination, or these materials are handled in the work rooms for handling radioactive materials .

2. When using the containers designated in the preceding paragraph for the purposes listed in the left column of the following table, the employer shall ensure that each of such containers has the structure correspondingly listed in the right column of the same table according to the classified uses.

Usage	Structure
To contain radioactive materials or contaminated objects that may cause air pollution	To be made of corrosion-resistant material and to have the air leak-tight structure
To contain liquid radioactive materials or wet contaminated objects by such radioactive materials.	To be made of corrosion-resistant material and impermeable to the liquids and have a liquid leak-tight structure
To contain radioactive materials or contaminated objects in order to transport them outside of the controlled area	1) To meet the requirement that the 1 cm dose equivalent rate at the surface of the container (at the surface of the packaging when packed, the same shall apply below in this item) is less than 2 mSv/h（10 mSv/h where transportation is by exclusive freight under the provisions of Item 6 of Article 1 of the Ordinance on Transport of Containers Outside of Nuclear Fuel, etc., Factories and Facilities (Ordinance of Prime Minister's Office No. 57, 1978) (called "exclusive freight" below) and where the technical standard of the transportation complies with Paragraph 2 of Article 4 and each item of Paragraph 3 of Article 19 of the Ordinance on Vehicular Transport of Nuclear Fuel Materials, etc. (Ministry of Transport Ordinance No. 72, 1978) and Paragraph 2 of Article 4 and each item of Paragraph 3 of Article 18 of the Ordinance on the Vehicular Transport of Radioactive Isotopes (Ministry of Transport Ordinance No. 33, 1977) and also where the approval from the Minister of Health, Labour and Welfare is received that there are no obstacles to preventing health hazards for workers. 2) The 1 cm dose equivalent rate at a distance of 1 m from the surface of the container is 0.1 mSv/h or less. This shall not apply when the container is transported using exclusive freight and also where the

	approval from the Minister of Health, Labour and Welfare is received that there are no obstacles to preventing health hazards for workers.

3. The employer shall put notices on the containers as described in Paragraph 1, which state that the containers contain radioactive materials or contaminated objects therein.

4. The employer shall indicate the items, as given below, on the containers which store, keep or carry the radiation materials, or store temporarily the said materials to dispose of the said materials.
   （1） Types of radioactive materials and their classification as gas, liquid or solid.
   （2） Types of radioisotopes contained in the radioactive materials and quantities of the radioisotopes.

(Protective Equipment)

Article 38.

Employers shall, if their workers are engaged in works in the area designated in the provisions of Article 28, emergency works, or other works in which the workers may inhale air contaminated to the level exceeding that designated by the Minister of Health, Labour and Welfare under Paragraph 3 of Article 3, provide them with effective personal respiratory protective equipment depending on the level of contamination, such as dust masks, gas masks, hose masks, oxygen breathing apparatuses, and make them use such equipment for the works.

2. When implementing the works as provided for by the preceding paragraph, workers shall use the protective equipment described in the same paragraph.

Article 39.

Employers shall, if their workers are engaged in works in which the workers may be contaminated to the level exceeding one tenth of the limit designated in the Attached Table 3, provide them with effective protective clothes, gloves and shoes, and make them use such items for the works.

2. When implementing the works as provided for by the preceding paragraph, workers shall use the protective equipment described in the same paragraph.

(Work Clothes)

Article 40.

When the employer has workers engage in work in the work rooms for handling radioactive

materials, he shall provide work clothes used exclusively for work in the said rooms, and shall have the workers use the said work clothes when the workers engage in the said work.

(Decontamination of Protective Equipment, etc.)

Article 41.

When the personal protective equipment or work clothes to be used conforming to the provisions of the preceding three articles are found to be contaminated to the levels exceeding those designated in the Attached Table 3 (to one tenth of the limit designated in the said Table for the parts of the personal protective equipment or work clothes which directly come into contact with the bodies of the workers, which applies hereinafter in this article), the employer shall not allow the workers to use such objects unless they are decontaminated by cleaning, etc., to the levels less than the limit designated in the said Table.

(Prohibition of Smoking, etc.)

Article 41-2.

Employers shall prohibit their workers from smoking, eating, or drinking in the work rooms for handling radioactive materials and any workplaces where they are likely to inhale or ingest radioactive materials and shall post notices at easily visible places in such workplaces.

2. Workers shall not smoke, eat, or drink at the workplaces set forth in the preceding paragraph.

Section 2 Prevention of Contamination Caused by Radioactive Materials Discharged by the Nuclear Power Plant Accident

(Clear Indications of the Border of the Disposal Sites of Accident-derived Wastes and Others)

Article 41-3.

Employers who operate a business to dispose of accident-derived wastes and others (the objects under the provisions of Paragraph 2 of Article 2 and contaminated by those which are prescribed by (a) or (b) of Item (2) of Paragraph 7 of Article 2 of the Ordinance for Decontamination, and other radioactive materials discharged by the accident (this shall mean radioactive materials discharged by the nuclear power plant due to the accident that occurred associated with the Tohoku-Pacific Ocean Earthquake that occurred on 11 March 2011; the same shall apply hereinafter), the same shall apply hereinafter) (hereafter in this section referred to as "disposal operator") shall indicate the border of the sites where the said business is operated with notices.

(Facilities for Handling Accident-derived Wastes and Others)

Article 41-4.

Disposal operators shall, when carrying out works for handling unsealed accident-derived wastes and others, provide dedicated work facilities and carry out the said works inside the said facilities.

2. The provisions of Paragraph 4 of Article 3 and Paragraph 2 of Article 33 shall apply mutatis mutandis to the work facilities in the preceding paragraph (hereinafter referred to as "facility for handling accident-derived wastes and others").

(Structure, etc. of Facilities for Handling Accident-derived Wastes and Others)

Article 41-5.

Disposal operators shall conform to the following, regarding walls, floors, and other places with a risk of contamination inside the facilities for handling accident-derived wastes and others:

(1) The parts shall be made of materials impermeable to gases or liquids and with high corrosion resistance.
(2) Surfaces shall be finished smoothly.
(3) Structures shall have as few protrusions, dents, or gaps as possible.
(4) In the case of possible contamination by liquids, structures shall be liquid leak-tight.

2. Disposal operators shall take measures to control dust spread when there is a risk of contamination by dust at the facilities for handling accident-derived wastes and others.

3. Disposal operators shall take measures to prevent spread of contamination such as by providing double-entry doors at the entrance and exit of the facilities for handling accident-derived wastes and others.

(Crushing Equipment)

Article 41-6.

Disposal operators shall, when crushing, classifying, compressing, or condensing accident-derived wastes and others, or contaminated objects outside the facilities for handling accident-derived wastes and others, use equipment that conforms to the following items according to the cases listed in the said items:

(1) In the case of possible contamination by gases, the equipment shall have a gas leak-tight structure, and shall be made of corrosion-resistant material with low gas permeability.

(2) In the case of possible contamination by liquids, the equipment shall have a liquid leak-tight structure, and shall be made of corrosion-resistant material with low liquid permeability.

(3) In the case of possible contamination by dust, the equipment shall have a structure with no possibility to spread the dust.

2. The provisions of Paragraph 2 of Article 33 shall apply mutatis mutandis to crushing equipment (this shall mean the equipment in the preceding paragraph and its accessory equipment; the same shall apply to Paragraph 1 of Article 34 which applies mutatis mutandis to Article 41-9).

(Belt Conveyors and Other Transportation Equipment)

Article 41-7.

Disposal operators shall, when transporting accident-derived wastes and others, or contaminated objects outside the facilities for handling accident-derived wastes and others, except for cases using containers as provided for by the text of Paragraph 1 of Article 37 which applies mutatis mutandis to Article 41-9, or taking measures for the proviso of the said Paragraph, use equipment that conforms to the following items according to the cases listed in the said items:

(1) In the case of possible contamination by gases, the equipment shall have a gas leak-tight structure, and shall be made of corrosion-resistant material with low gas permeability.

(2) In the case of possible contamination by liquids, the equipment shall have a liquid leak-tight structure, and shall be made of corrosion-resistant material with low liquid permeability.

(3) In the case of possible contamination by dust, the equipment shall have a structure with no possibility to spread the dust.

2. The provisions of Paragraph 2 of Article 33 shall apply mutatis mutandis to belt conveyors and other transportation equipment (this shall mean the equipment in the preceding paragraph and its accessory equipment; the same shall apply to Paragraph 1 of Article 34 which applies mutatis mutandis to Article 41-9).

(Landfill Facilities)

Article 41-8.

Disposal operators intending to conduct landfill operations for accident-derived wastes and others, or contaminated objects, shall conduct the work in landfill facilities separated from external surroundings and which are provided with a locking mechanism and other closing devices or tools at the parts leading to the outside of the said facilities, such as doors and covers ,etc.

2. The provisions of Paragraph 4 of Article 3 and Paragraph 2 of Article 33 shall apply mutatis mutandis to the landfill facilities in the preceding paragraph.

(Application to Other Cases)

Article 41-9.

The provisions of Paragraph 4 of Article 3 (limited to the applications to the cases of the provisions of Paragraph 3 of Article 33), Article 25, the text of Article 26, Paragraphs 1 and 2 of Article 27 (including the applications to the cases of the provisions of Paragraph 3 of Article 33), Articles 28 and 29, Paragraphs 1 and 2 of Article 30, Articles 31 and 32, Paragraphs 1 and 2 of Article 33 (including the applications to the cases of the provisions of Paragraph 2 of Article 34 and Paragraph 2 of Article 35), Paragraph 1 of Article 34, Paragraph 1 of Article 35, Article 37 (except Paragraph 4), and Articles 38 to 41-2 shall be applicable with necessary modifications to the disposal operators. In this case, the terms under the provisions of the left (upper) columns listed in the middle columns of the following table shall be replaced with the terms listed in the right (lower) columns of the said Table.

Article 25	work rooms for handling radioactive materials and/or inside mines for mining nuclear raw materials	facilities for handling accident-derived wastes and others
Text of Article 26	the radioactive materials	the accident-derived wastes and others
	of radioactive materials	of accident-derived wastes and others

	the employer shall install or provide facilities with boards, curtains, etc., thereby to prevent the said spray or powder of radioactive materials from adhering to the bodies of workers, or work clothes, footwear, personal protective equipment, etc., which the said workers wear (hereafter called "equipment worn"),	the employer shall require their workers who engage in the said works to use personal protective equipment under the provisions of Paragraph 1 of Article 39 which applies mutatis mutandis to Article 41-9,
Paragraph 1 of Article 27	radioactive materials	accident-derived wastes and others
	forceps, tweezers, etc.	shovels, etc.
Article 28	radioactive materials are	accident-derived wastes and others are
	the inside of the work rooms for handling radioactive materials	the inside of the facilities for handling accident-derived wastes and others
Paragraph 1 of Article 29	work rooms for handling radioactive materials	facilities for handling accident-derived wastes and others
	facilities, etc.	facilities, etc. (limited to the parts where the workers might touch)
Paragraph 1 of Article 32	shall be inspected.	shall be inspected, except where the items are to be carried out under the provisions of Paragraph 1 of Article 41-7.
Paragraph 2 of Article 32	use the containers as provided for by the text of Paragraph 1 of Article 37 or	when transporting radioactive materials under the provisions of Paragraph 1 of Article 41-7 or use the containers as provided for by the text of Paragraph 1 of Article 37 which applies mutatis mutandis to Article 41-9 or
	work rooms for handling radioactive materials, facilities for disposal, or other controlled areas,	facilities for disposal or discarding of accident-derived wastes and others,
Paragraph 1 of Article 33	radioactive materials	accident-derived wastes and others
Paragraph 1 of Article 34	work rooms for handling	facilities for handling

	radioactive materials	accident-derived wastes and others, crushing equipment, or belt conveyors and other transportation equipment
Paragraph 1 of Article 35	radioactive materials	accident-derived wastes and others
Paragraph 1 of Article 37	the radioactive materials	the accident-derived wastes and others
	radioactive materials or	accident-derived wastes and others or
	stores these materials for disposal, or temporarily stores these materials before disposal	temporarily stores these materials before disposal, or landfills these materials
	or carries radioactive materials in work rooms for handling radioactive materials	handles these materials in facilities for handling accident-derived wastes and others, or, carries these materials under the provisions of Paragraph 1 of Article 41-7
Paragraphs 2 and 3 of Article 37	radioactive materials	accident-derived wastes and others
Article 40	Inside of the work rooms for handling radioactive materials	Inside of the facilities for handling accident-derived wastes and others
Paragraph 1 of Article 41-2	work rooms for handling radioactive materials	facilities for handling accident-derived wastes and others,
	the radioactive materials	the accident-derived wastes and others

(Exemption for Special Decontamination Areas, etc.)

Article 41-10.

Concerning the landfill of accident-derived wastes and others, (limited to the removed soil prescribed in (a) of Item (2) of Paragraph 7 of Article 2 of the Ordinance for Decontamination, the same shall apply hereafter in this paragraph) in the special decontamination areas provided for by Paragraph 1 of Article 25 of the Act on Special Measures Concerning the Handling of Environmental Pollution by Radioactive Materials Discharged by the Nuclear Power Station Accident Associated with the Tohoku District Off the Pacific Ocean Earthquake That Occurred on 11 March 2011 (Act No. 110 of 2011) or intensive contamination survey areas provided for by Paragraph 1 of Article 32 of the same Act (hereafter in the next paragraph referred to as “special decontamination areas, etc.”), the provisions of Article 37 (except Paragraph 4) which applies mutatis mutandis to the preceding

article and the provisions of Article 41-5 shall not be applied provided that the measures listed in the following items are taken.

(1) Measures to prevent contamination of workers' bodies by accident-derived wastes and others, such as carrying out the works by remote control.

(2) Measures to control spread of dust such as wetting accident-derived wastes and others.

(3) Measures to control spread of dust such as by working at a place as far away from the border of the landfill facility as possible.

(4) Measures to determine the surface density of radioactive materials discharged by the accident at the border of the landfill facility at least monthly and to control the said surface density to less than whichever is higher of the limit listed in the Attached Table 3 and the surface density of radioactive materials discharged by the accident at the surroundings of the said landfill facility.

2. When the provisions of Articles 28, 31, 32, and Paragraph 2 of Article 33 (limited to the case of application mutatis mutandis to Paragraph 2 of Article 35), Paragraph 1 of Article 35, and Article 37 (except Paragraph 4) which are all related to the disposal works of accident-derived wastes and others, shall apply mutatis mutandis to special decontamination areas, etc., the terms under the provisions of the left (upper) columns listed in the middle columns of the following table shall be replaced with the terms listed in the right (lower) columns of the said Table.

Article 28	contamination is reduced to the limit or less than the limit listed in the Attached Table 3, providing that the level to which the contamination is to be reduced may be one tenth of the limit listed in the said Table where the contamination has occurred in the place other than facilities for handling accident-derived wastes and others,	in the case of indoors, remove the contaminant until the degree of the contamination is reduced to the limit or less than the limit listed in the Attached Table 3, and in the case of outdoors, reduced to less than whichever is higher of the limit listed in the said Table and the surrounding surface density of radioactive materials discharged by the accident
Paragraph 1 of Article 31	exit of	or exit of the operating site
	one tenth of the limit designated in the Attached Table 3	the limit designated in the Attached Table 3
Paragraph 2 of Article 31, Paragraph 2 of Article 32, and Paragraph 1 of Article 35	one tenth of the limit designated in the Attached Table 3	the limit designated in the Attached Table 3

Chapter 4-2 Control of Special Works

(Work Rules at Processing Facilities, etc.)

Article 41-11.

In carrying out work involving the handling of nuclear fuel materials (such as those prescribed in Paragraph 2 of Article 3 of the Atomic Energy Basic Law (Law No. 186, 1955); hereinafter the same), spent fuel materials (such as those prescribed in Paragraph 8 of Article 2 of the Law Concerning Regulations on Nuclear Raw Materials, Nuclear Fuel Materials and Nuclear Reactors; hereinafter the same), or anything contaminated by such materials (including fission products; hereinafter the same) within a controlled area of a processing facility (such as those prescribed in Item 2, paragraph 2 of Article 13 of the Law Concerning Regulations on Nuclear Raw Materials, Nuclear Fuel Materials and Nuclear Reactors (Law No. 166, 1957), which are the same as in Paragraph 1 of Article 52-6), reprocessing facilities (such as those prescribed in Item 2, Paragraph 2 of Article 44 of the same law, which are the same as in Paragraph 1 of Article 52-6), or facilities that use such materials, etc. (such as those prescribed in Paragraph 3 of Article 53 of the same law [limited to those using nuclear fuel materials as prescribed in Article 16-2 of the Cabinet Order Concerning the Regulations on Nuclear Raw Materials, Nuclear Fuel Materials and Nuclear Reactors (Cabinet Order No. 324, 1957)]; which are the same as in Paragraph 1 of Article 52-6), the employer shall formulate regulations necessary to protect workers from hazards due to radiation for such works with respect to the following matters, and shall carry out such works according to such regulations.

（1） Operations of processing facilities, reprocessing facilities or facilities that use such materials, etc.

（2） Coordination and adjustment of safety devices and automatic alarm devices.

（3） Steps to prevent nuclear fuel materials from accidentally reaching a critical state.

（4） Operational methods and procedures.

（5） Measures concerning the monitoring of dose equivalent rates due to external radiation and the concentration of radioactive materials in the air.

（6） Measures concerning inspections with respect to the contamination of surface areas of the ceilings, floors, walls, facilities, etc., and the removal of such contamination.

（7） Emergency measures at the time any abnormal event occurs.

（8） In addition to each item above, the measures necessary to protect workers from radiation hazards.

2. When formulating the regulations prescribed in the preceding paragraph, the employer shall take steps to ensure that the workers involved become fully aware of each item in the same

paragraph.

(Work Rules at Nuclear Reactor Facilities)

Article 41-12.

In carrying out work involving the handling of nuclear fuel materials, spent fuel materials, or anything contaminated by such materials within a controlled area of nuclear reactor facilities (such as those prescribed in Item 5, Paragraph 2 of Article 23 of the Law Concerning Regulations on Nuclear Raw Materials, Nuclear Fuel Materials and Nuclear Reactors; which are the same as in Paragraph 1 of Article 52-7), the employer shall formulate regulations necessary to protect workers from hazards due to radiation for such work with respect to the following matters, and shall carry out such work according to such regulations.

（1） Operational methods and procedures.

（2） Measures concerning the monitoring of dose equivalent rates due to external radiation and the concentration of radioactive materials in the air.

（3） Measures concerning inspections with respect to the contamination of surface areas of the ceilings, floors, walls, facilities, etc., and the removal of such contamination.

（4） Emergency measures at the time any abnormal event occurs.

（5） In addition to each item above, the measures necessary to protect workers from radiation hazards.

2. When formulating the regulations prescribed in the preceding paragraph, the employer shall take steps to ensure that the workers involved become fully aware of each item in the same paragraph.

（Work Rules for Works Related to Disposal of Accident-derived Wastes and Others）

Article 41-13.

When carrying out works related to disposal of accident-derived wastes and others, the employer shall formulate regulations necessary to protect workers from hazards due to radiation for such works with respect to the following matters, and shall carry out such works according to such regulations:

(1) Operation of equipment related to disposal of accident-derived wastes and others.

(2) Adjustment of safety devices and automatic alarm devices.

(3) Operational methods and procedures.

(4) Measures concerning the monitoring of dose equivalent rates due to external radiation and the concentration of radioactive materials in the air.

(5) Measures concerning inspections with respect to the contamination of surface areas of the

ceilings, floors, walls, facilities, etc., and the removal of such contamination.

(6) Emergency measures at the time any abnormal event occurs.

(7) In addition to each item above, the measures necessary to protect workers from radiation hazards.

2. When formulating the regulations prescribed in the preceding paragraph, the employer shall take steps to ensure that the workers involved become fully aware of each item in the same paragraph.

（Submission of the Work Request for Disposing Accident-derived Wastes and Others）

Article 41-14.

When carrying out the following works, the employer (limited to a primary contractor, when he exists, specified in Article 15 (1) of the Industrial Safety and Health Act (hereinafter referred to as “The law”) shall submit a work request in advance to the Head of the Labour Standards Inspection Office with jurisdiction over the district in which the workplace exists (hereafter referred to as “The Head of the relevant Labour Standards Inspection Office”).

(1) Works to dismantle or enter the facilities contaminated by accident-derived wastes and others, to demolish, modify, repair, clean, or inspect the said facilities.

(2) Works in which the total of the effective dose due to external radiation and the effective dose due to radioactive materials in the air may exceed 1 mSv per week.

2. The provisions of Paragraph 2 of Article 3 and Paragraph 3 of Article 3-2 shall apply mutatis mutandis to calculate the effective dose due to external radiation and the effective dose due to radioactive materials in the air provided for in Item 2 of the preceding paragraph.

Chapter 5　Emergency Measures

(Evacuation)

Article 42.

When an accident under any one of the following categories has occurred, the employer shall have the workers immediately evacuate the area in which the effective dose resulting from the accident may exceed 15 mSv.

（1） The shield installed conforming to the provision of Paragraph 1 of Article 3-2 is broken in the middle of the handling of the radioactive materials or in the middle of irradiation using the radioactive materials, and the irradiation cannot be stopped immediately.

（2） The local exhaust ventilation system or the emission source enclosure system installed conforming to the provisions of Paragraph 1 of Article 3-2 does not function properly due to faults or damage.

（3） A great deal of radioactive materials has leaked, spilled or been scattered.

（4） The radiation source loaded with the radioactive materials has fallen from the radiation source container or the radiation source, taken out of its container, has become unable to be returned to the container due to a failure of the radiation source carrier device or the remote control system to control the position of the radiation source.

（5） Accidents other than those described above.

2. The employer shall put up a notice which indicates the existence of the areas described in the preceding paragraph.

3. The employer shall not have workers enter into the areas as described in Paragraph 1, provided that this shall not apply in respect to the case in which the employer has the workers engage in emergency works.

(Report on Accidents)

Article 43.

When there occur areas as provided for by Paragraph 1 of the preceding article, the employer shall submit a report to the Head of the relevant Labour Standards Inspection Office.

(Medical Examination, etc.)

Article 44.

The employer shall immediately have those workers falling under any one of the following categories submit to a medical examination or treatment of a medical doctor.

(1) Those who were in the area designated in Paragraph 1 of Article 42 when any one of the accidents designated in the items of the said Paragraph of the said Article occurred.
(2) Those who have been exposed to the effective dose or equivalent dose exceeding the limit specified in Paragraph 1 of Article 4, or Article 5.
(3) Those who accidentally inhaled or orally taken in radioactive materials.
(4) Those who have been unable to reduce the contamination of their bodies to one tenth of the limit specified in the Attached Table 3 by washing their bodies, etc.
(5) Those with open-wound parts of their bodies contaminated by radioactive materials.

2. When the employer finds the case in which there are workers falling in any items of preceding paragraph, he shall make a report on that fact to the Head of the relevant Labour Standards Inspection Office without delay.

(Measurement and Recording of Information in Accidents)

Article 45.

When an accident falling in any one of the categories designated in the items of Paragraph 1 of Article 42 has occurred, and the area designated in the said Paragraph has come to exist as a result, the employer shall measure the effective dose and equivalent dose for eye lens and skin to which each of the workers present in the said area or each of those who have engaged in emergency works in the said area has been exposed, and shall prepare records of the following matters, and keep them on file for at least five years.

(1) Time, date and place of the accident
(2) Cause and condition of the accident
(3) Conditions of the hazards caused by the radiation
(4) Emergency measures taken by the employer

2. When the effective dose or equivalent dose is not known for those workers provided for in the preceding paragraph, the employer shall measure the dose equivalent rate due to the external radiation at the main locations in the area designated in Paragraph 1 of Article 42, the concentration of the radioactive materials in the air or the surface density of the radioactive materials with the appropriate radiation measuring instruments and calculate the effective dose equivalent and equivalent dose defined in the preceding paragraph based on the result of the said calculation.

3. When it is extremely difficult to measure the dose equivalent rate provided for in the preceding paragraph using radiation measuring instruments, it may be determined by calculation,

notwithstanding the provision of the said Paragraph.

Chapter 6 Operations Chief of Work with X-rays and Operations Chief of Transmissive Photography with Gamma-rays

(Appointment of an Operations Chief of Work with X-rays)

Article 46.

In terms of the work as provided for by Item 5 of Article 6 of the Cabinet Order, the employer shall appoint on operations chief of work with X-rays from among those who have been granted the license for operations chief of work with X-rays in each of the controlled areas.

(Duties of Operations Chief of Work with X-rays)

Article 47.

The employer shall have the operations chief of work with x-rays perform the following functions:

（1） Make sure that the notices conforming to Paragraph 1 of Article 3 or Paragraph 4 of Article 18 are put up as provided for in the said Paragraph.

（2） Make sure that the irradiation cylinder or diaphragm conforming to Paragraph 1 of Article 10 or the filtration plate conforming to Article 11 are used properly.

（3） Make sure that the measures conforming to each item of Article 12 or 13, or Article 18-2 are taken accordingly.

（4） Control the irradiation condition so that the dose of the exposure to the radiation workers can be minimized as low as possible, in addition to the measures as provided for by the preceding two items.

（5） Inspect whether the measures provided for in Paragraph 1 of Article 17 are taken conforming to the provision of the said Paragraph of the said Article.

（6） Make sure that the place designated in Paragraph 1 of Article 18 is cleared of workers before the start of irradiation and during it.

（7） Inspect whether the radiation measuring instrument provided for in Paragraph 3 of Article 8 is in conformity to the provision of the said Paragraph.

(License for Operations Chief of Work with X-rays)

Article 48.

The license for operations chief of work with X-rays shall be granted to those who have passed the license examination for operations chief of work with X-rays and also to those as listed in the following items by the Director General of the Prefectural Labour Bureau.

(1) Those who have been granted the license as provided for by the provisions of Paragraph 1 of Article 3 of the Act on Medical Radiology Technicians (Law No. 226, 1951).

(2) Those who are granted the license for chief technicians responsible for operation of nuclear

reactors as provided for by Paragraph 1 of Article 41 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors.

(3) Those who are granted the license for first class chiefs responsible for handling of radioactive materials as provided for by Paragraph 1 of Article 35 of the Act on Prevention of Radiation Disease Due to Radioactive Isotope, etc..

(Reasons for Not Granting a License for Operations Chief of Work with X-rays)

Article 49.

Those who are so designated by the Ministry of Health, Labour and Welfare Ordinance based on the provisions of Item 2 of Paragraph 2 of Article 72 of the Law, concerning licenses for operations chief of work with X-rays, shall be younger than 18 years old.

(Subjects, etc., in License Examination for Operations Chief of Work with X-rays)

Article 50.

The license examination for operations chief of work with X-rays shall be conducted in terms of the following subjects in the form of paper tests:

(1) Knowledge of control of X-rays.

(2) Knowledge of measurements of X-rays.

(3) Knowledge of effects of X-rays on organisms.

(4) Related laws and ordinances.

(Exemption of Examination Subjects for License Examination of Operations Chief of Work with X-rays)

Article 51.

The Director General of the Prefectural Labour Bureau may exempt those who fall under any one of the categories set forth in the following items from the examination subjects designated in each of the said Paragraphs in the license examination for the operations chief of work with x-rays.

(1) Those who have been granted the license of the class-2 radiation-related work supervisor conforming to Paragraph 1, Article 35 of the Act on Prevention of Radiation Disease Due to Radioactive Isotope, etc. and the class-2 radiation-related work supervisor conforming to Paragraph 1, Article 17-5 of the Enforcement Order of the said Law may be exempted from the examination subjects designated in Items 2 and 3 of the preceding article.

(2) Those who have been granted the license of operations chief of transmissive photography with gamma-rays may be exempted from the examination subjects designated in Item 3 of the preceding paragraph.

(Details on License Examination for Operations Chief of Work with X-rays)

Article 52.

In addition to the items as provided by Article 71 of the Ordinance on Industrial Safety and Health (Ministry of Labour Ordinance No. 32, 1972, hereafter called "Safety and Health Ordinance") and also by the preceding two articles, the items necessary for carrying out of the license examination for operations chief of work with X-rays will be established by the Minister of Health, Labour and Welfare.

(Appointment of Operations Chief of Transmissive Photography with Gamma-rays)

Article 52-2.

In terms of the work listed in Item 5-2 of Article 6 of the Cabinet Order, the employer shall appoint an operations chief of transmissive photography with gamma-rays from among those who have been granted the license for operations chief of transmissive photography with gamma-rays in each of the controlled areas.

(Duties of Operations Chief of Transmissive Photography with Gamma-rays)

Article 52-3.

The employer shall have the operations chief of transmissive photography with gamma-rays perform the following functions:

(1) Make sure that the notices provided for in Paragraph 1 of Article 3 or Paragraph 4 of Article 18 are put up conforming to the provision of the said Paragraph of the said Article.
(2) Inspect the performance of the radiation source carrier devices or remote control system to adjust the position of the radiation source before starting its operation.
(3) Check whether the transmission tube is moved conforming to the provision of Item 1 of Article 18-4 and also whether the radiation source is taken out conforming to the provision of Article 18-3.
(4) Make sure that the place designated in Paragraph 1 of Article 18 is cleared of the workers before and during the irradiation.
(5) Inspect whether the measures provided for in Paragraph 1 of Article 17 are executed accordingly and also whether the radiation measuring instrument designated in Paragraph 3 of Article 8 is installed accordingly.
(6) Take the measures provided for in Article 18-2.
(7) Take the measures provided for in Item 2 of Article 18-4.
(8) Control the irradiation condition so that the dose of the radiation workers can be minimized as low as possible, in addition to taking the measures of the above two items.
(9) Inspect the position of the radiation source and the condition of the shield using the

radiation measuring instrument during the operation.

(10) Conduct the inspection provided for in Paragraph 1 of Article 19.

(11) Take the measures provided for in Item 4 of Paragraph 1 of Article 42 when the accident designated in the said Article occurs and notify the employer to that effect.

(12) Take the measure provided for in Article 18-10 in carrying out the work for putting the radiation source into the radiation source container or another container and have the workers use the forceps, etc., in order to keep an appropriate distance between the workers and the radiation source at the time of the accident designated in Item 4 of Paragraph 1 of Article 42.

(License for Operations Chief of Transmissive Photography with Gamma-rays)

Article 52-4.

The license for operations chief of transmissive photography with gamma-rays shall be granted by the Director General of the Prefectural Labour Bureau to those who have passed the license examination of operations chief of transmissive photography with gamma-rays and those who fall under any one of the following categories:

(1) Those who have the license conforming to Paragraph 1, Article 3 of the Act on Medical Radiology Technicians.

(2) Those who have the license of the nuclear reactor operation supervisor conforming to Paragraph 1, Article 41 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors.

(3) Those who have the license for the class-1 radiation-related operation supervisor conforming to Paragraph 1, Article 35 of the Act on Prevention of Radiation Disease Due to Radioactive Isotope, etc. or the license of class-2 radiation-related operation supervisor conforming to Paragraph 1, Article 17-5 of the Enforcement Order of the said Law.

(Reasons for Not Granting a License for Operations Chief of Transmissive Photography with Gamma-rays)

Article 52-4-2.

Those who are designated as such by the Ministry of Health, Labour and Welfare Ordinance based on the provisions of Item 2 of Paragraph 2 of Article 72 of the Law concerning licenses for operations chief of transmissive photography with gamma-rays, shall be younger than 18 years old.

(Subjects, etc., in License Examination for Operations Chief of Transmissive Photography with Gamma-rays)

Article 52-4-3.

The license examination for operations chief of transmissive photography with gamma-rays shall be conducted in terms of the following subjects in the form of paper tests:

(1) Knowledge on work to undertake transmissive photography with gamma-rays.

(2) Knowledge on gamma-ray radiation equipment.

(3) Knowledge on effects of gamma-rays on organisms.

(4) Related laws and ordinances.

(Exemption of Subjects in License Examination for Operations Chief of Transmissive Photography with Gamma-rays)

Article 52-4-4.

The Director General of the Prefectural Labour Bureau may grant exemptions in the subjects for examination listed in Item 3 of the preceding article out of the subjects of examination in the license examination for operations chief of transmissive photography with gamma-rays for those who have passed the license examination for operations chief of work with X-rays.

(Details on License Examination for Operations Chief of Transmission Photography with Gamma-rays)

Article 52-4-5.

In addition to the items as provided by Article 71 of the Safety and Health Ordinance and also by the preceding two articles, the items necessary for carrying out of the license examination for operations chief of transmissive photography with gamma-rays will be established by the Minister of Health, Labour and Welfare.

Chapter 6-2 Special Education

(Special Education Concerning Work to Undertake Transmissive Photography)

Article 52-5.

When the employer has workers engage in work to undertake transmissive photography with X-ray equipment or with gamma-ray radiating equipment, he shall give special education to the said workers in terms of the subjects as given below:

(1) Methods for carrying out the work thereby to undertake transmissive photography.

(2) Structure of X-ray equipment and gamma-ray radiating equipment, and on how to operate this equipment.

(3) Effects of ionizing radiation on organisms.

(4) Related laws and ordinances.

2. In addition to the items as provided for by Articles 37 and 38 of the Safety and Health Ordinance and also by the preceding paragraph, the items necessary for carrying out the special education as provided for by the same paragraph will be established by the Minister of Health, Labour and Welfare.

(Special Education Concerning Work Involving the Handling of Nuclear Fuel Materials, etc., at Processing Facilities, etc.)

Article 52-6.

When the employer assigns workers to engage in work involving the handling of nuclear fuel materials, spent fuel materials, or anything contaminated by such materials within a controlled area of processing facilities, reprocessing facilities, or facilities that use such materials, etc., the employer shall provide special education to the said workers in terms of the subjects as given below.

(1) Knowledge about nuclear fuel materials, spent fuel materials, or anything contaminated by such materials.

(2) Knowledge about work methods at processing facilities, reprocessing facilities, or facilities that use such materials, etc.

(3) Knowledge about equipment structure and equipment handling methods at processing facilities, reprocessing facilities, or facilities that use such materials, etc.

(4) Effects of ionizing radiation on organisms.

(5) Related laws and ordinances.

(6) Handling of equipment used in implementing the work methods at processing facilities, reprocessing facilities, or facilities that use such materials, etc.

2. In addition to the items as provided for by Articles 37 and 38 of the Safety and Health Ordinance and also by the preceding paragraph, the items necessary for carrying out the special education as provided for by the same paragraph will be established by the Minister of Health, Labour and Welfare.

(Special Education Concerning Work Involving the Handling of Nuclear Fuel Materials, etc., at Nuclear Reactor Facilities)

Article 52-7.

When the employer assigns workers to engage in work involving the handling of nuclear fuel materials, spent fuel materials, or anything contaminated by such materials within a controlled area of the nuclear reactor facilities, the employer shall provide special education to the said workers in terms of the subjects as given below:

(1) Knowledge about nuclear fuel materials, spent fuel materials, or anything contaminated by such materials.
(2) Knowledge about work methods at nuclear reactor facilities.
(3) Knowledge about the equipment structure and handling methods at nuclear reactor facilities.
(4) Effects of ionizing radiation on organisms.
(5) Related laws and ordinances.
(6) Handling of equipment used in implementing the work methods at nuclear reactor facilities.

2. In addition to the items as provided for by Articles 37 and 38 of the Safety and Health Ordinance and also by the preceding paragraph, the items necessary for carrying out the special education as provided for by the same paragraph will be established by the Minister of Health, Labour and Welfare.

(Special Education Regarding Works for Disposing Accident-derived Wastes and Others)

Article 52-8.

The employer shall, when the workers carry out works for disposing accident-derived wastes and others, provide special education to the said workers regarding the subjects listed in the following items:

(1) Knowledge of accident-derived wastes and others.
(2) Knowledge of methods of works for disposing accident-derived wastes and others.
(3) Knowledge of structure and handling of machinery, etc. used for works for disposing accident-derived wastes and others.

(4) Knowledge of effects of ionizing radiation on organisms, and methods of exposure dose control.

(5) Related laws and ordinances.

(6) Handling of machinery, etc. used in implementing the method of works for disposing accident-derived wastes and others.

2. In addition to the items as provided for by Articles 37 and 38 of the Safety and Health Ordinance and also by the preceding paragraph, the items necessary for carrying out the special education as provided for by the same paragraph will be established by the Minister of Health, Labour and Welfare.

Chapter 7　Working Environment Measurements

（Workplaces Where the Work Environment Measurements Shall Be Done）

Article 53.

The workplaces as established by the Ministry of Health, Labour and Welfare Ordinance based on the Item 6 of Article 21 of the Cabinet Order are as given below:

(1) The portion corresponding to the controlled areas of sites in which radiation works are carried out.

(2) Work rooms for handling radioactive materials.

(2) (ii) Facilities for handling accident-derived wastes and others.

(3) Workplaces in which works listed in Item 7 of Attached Table 2 of the Cabinet Order are carried out.

(Measurements, etc., of Dose Equivalent Rate)

Article 54.

Employers shall periodically measure the dose equivalent rate or dose equivalent due to external radiation in the controlled area designated in Item 1 of the preceding article by using radiation measuring instruments at least monthly (or at least in every 6 months where stationary radiation equipment is used with a predetermined method and fixed shielding positions or where the radiation equipment loaded with radioactive source material of less than 3.7 GBq is used), record the following matters for each measurement and store the records for five years.

(1) Measurement date and time

(2) Measurement method

(3) Type, model and performance of measurement devices

(4) Measurement place

(5) Measurement conditions

(6) Measurement results

(7) Name of the person in charge of the measurements

(8) General description of actions taken based on the measurement results

2. Notwithstanding the provisions of the preceding paragraph, the dose equivalent rate and dose equivalent set forth in the preceding paragraph may be determined by calculation when measurement using a radiation measuring instrument is extremely difficult.

3. The measurements specified in Paragraph 1 or the calculations specified in the preceding paragraph shall be made for a 1 cm dose equivalent rate or 1 cm dose equivalent. However, in

places where a 70 μm dose equivalent rate may exceed 10 times the 1 cm dose equivalent rate, or a 70 μm dose equivalent may exceed 10 times the 1 cm dose equivalent in the controlled areas prescribed in Item 1 of the preceding article, the same shall be made for the 70 μm dose equivalent rate or the 70 μm dose equivalent.

4. Employers shall inform workers who enter the controlled area of the results of the measurements specified in Paragraph 1 or the results of the calculation specified in Paragraph 2 by posting them at an easily visible place, etc.

(Measurements of Concentrations of Radioactive Materials)

Article 55.

In terms of the workplaces as provided for by Items 2 to 3 of Article 53, the employer shall make measurements of concentrations of radioactive materials in the air periodically, once at an interval which is shorter than a month by radiation measuring instruments, and shall record these measurements each time as given in the respective items of Paragraph 1 of the preceding article and shall keep the records for a period of five years.

Chapter 8 Medical Examinations

(Medical Examinations)

Article 56.

Employers shall provide their workers who are regularly engaged in radiation works and enter the controlled areas with medical examinations by medical doctors regarding the following items, at the time of employment and reallocation, and periodically once every six months thereafter.

(1) Investigation and evaluation of radiation exposure history (for workers with an exposure history, confirm the location of works, nature of works, duration, existence of radiation damage, existence of subjective symptoms and other details concerning radiation exposure)
(2) Examination of leukocyte count and percentage
(3) Examination of red blood cell count and hemoglobin contents or hematocrit values
(4) Examination of eyes for cataract
(5) Examination of skin

2. Among the medical examination items in the preceding paragraph, those prescribed in Item (4) of the same paragraph may be omitted depending on the type, etc., of radiation sources used with respect to the items required at the time of employment or reallocation to the said works.

3. Among the medical examination items provided in Paragraph 1 that must be carried out periodically, all or some of Items (2) to (5) of the said Paragraph may be omitted if medical doctors determine those examinations are unnecessary.

4. Regardless of the provisions of Paragraph 1, the items described in Items (2) through (5) in the said Paragraph may be exempted if medical doctors determine those examinations are unnecessary for the workers whose effective doses did not exceed 5 mSv in the year before the medical examinations (limited to periodical examinations; the same shall apply to this paragraph), and their effective doses are not likely to exceed 5 mSv in the year the medical examinations will be conducted.

5. At the time of the medical examinations under the provisions of Paragraph 1, employers shall submit data showing the dose to which the said workers have been exposed since the last medical examinations to the examining medical doctors (or shall submit material necessary to estimate the dose in the case such dose cannot be derived by calculation [or shall submit material necessary to understand the situation in which the said workers were exposed to the

said radiation in case such material is not available]).

(Recording of Results of Medical Examinations)

Article 57.

The employer shall prepare the Ionizing Radiation Medical Examination Cards (Form No.1-2) based on the results of the medical examinations provided for by Paragraph 1 of the preceding article (including medical examinations received by workers under the proviso of Paragraph 5 of Article 66 of the Law and called the "ionizing radiation medical examination" in the following article and Article 59) and keep the cards for a period of 30 years. However, this shall not apply when such records are transferred to an organization designated by the Minister of Health, Labour and Welfare, after being kept for five years.

(Hearing the Views of the Medical Doctor Concerning the Results of the Medical Examinations)

Article 57-2.

Under the provisions of Article 66-4 of the Law, the views of the medical doctor based on the results of the ionizing radiation medical examination shall be heard in compliance with the following stipulations:

(1) Within three months of the date when the ionizing radiation medical examination was carried out (where the proviso of Paragraph 5 of Article 66 of the Law applies, the date when the said worker submitted the document showing the results of the medical examination to the employer).

(2) The reviews of the medical doctor shall be recorded on the Ionizing Radiation Medical Examination Cards.

(Notification of Results of Medical Examinations)

Article 57-3.

Employers shall notify their workers who underwent the medical examinations provided in Paragraph 1 of Article 56 of their medical examination results without delay.

(Reporting the Results of Medical Examinations)

Article 58.

When the employer has medical doctors carry out medical examinations, as provided for by Paragraph 1 of Article 56, (restricted only to those done periodically), he shall submit without delay the Report on the Results of the Medical Examinations on Ionizing Radiation (Form No. 2) (front page)(back page) to the Head of the relevant Labour Standards Inspection Office.

(Measures Based on Medical Examinations, etc.)

Article 59.

Based on the results of the ionizing radiation medical examinations, the employers shall take needed measures to protect the health of their workers who have or may have developed a radiation related disorder. For example, employers may need to transfer the workers to alternative positions or locations, or change the hours of work or work procedures until complete remission.

Chapter 9 Submission of Records Concerning Designated Emergency Workers

(Submission of Records Concerning Designated Emergency Workers)

Article 59-2.

Employers shall without delay submit a copy (a copy of the relevant electromagnetic record on an electromagnetic medium if the relevant record is prepared as electromagnetic records (records prepared by an electronic method, magnetic method or any other method which cannot be recognized by human perception, and provided for information processing by an electronic computer)) of the record of the results of medical examinations described in the following items concerning the medical examinations received by workers (referred to as "designated emergency workers" in Form 3) who are or have been engaged in emergency works designated by the Minister of Health, Labour and Welfare (hereafter in this article and Form 3 referred to as "designated emergency works") during the period of the emergency works or radiation works (including the time periods in which the relevant workers are required to receive medical examinations according to the direction of the provisions of Paragraph 4 of Article 66 of the Industrial Safety and Health Law) to the Minister of Health, Labour and Welfare.

(1) An individual medical examination card provided for by Article 51 of the Ordinance on Industrial Safety and Health (limited to the record of results of medical examinations performed under Paragraph 1 of Article 44 and Paragraph 1 of Article 45 of the Ordinance on Industrial Safety and Health, and under the directions of the provisions of Paragraph 4 of Article 66 of the Industrial Safety and Health Law) (Form 5 in the Ordinance on Industrial Safety and Health)

(2) An Ionizing Radiation Medical Examination Card provided for by Article 57 (Form 1) or an Ionizing Radiation Medical Examination Card for Decontamination provided for by Article 21 of the Ordinance for Decontamination (Form 2)

2. Employers shall, on the day prescribed in the respective items, prepare and submit to the Minister of Health, Labour and Welfare a dose, etc. control status report (Form 3) that includes the dose of the relevant workers calculated using a method stipulated by the Minister of Health, Labour and Welfare and prescribed in Paragraph 2 of Article 9, records specified in the provisions of Paragraph 1 of Article 45, and other necessary matters based on the results of measurement or calculation under the provisions of Paragraph 3 or 5 of Article 8, corresponding to the classification of workers listed in the following items, in writing or by electromagnetic record on an electromagnetic medium (electronic method, magnetic method or any other method which cannot be recognized by human perception).

(1) Workers engaged in the designated emergency works: the last day of every month (limited

to the period during which the relevant workers are engaged in the designated emergency works)

(2) Workers engaged in radiation works (except the designated emergency works): the last day of every third month (limited to the period during which the relevant workers are engaged in radiation works (except the designated emergency works))

Chapter 10 Miscellaneous Provisions

(Provision of Radiation Measuring Instruments)

Article 60.

Employers shall have necessary radiation measuring instruments to fulfill the requirements specified herein. However, this shall not apply if any measures have already been taken to make radiation measuring instruments easily available anytime when needed.

(Notification Concerning Gamma-ray Radiation Equipment for Transmissive Photography)

Article 61.

When the employer has workers engage in work with gamma-ray radiation equipment for transmissive photography at places other than his workplace, he shall submit to the Head of the relevant Labour Standards Inspection Office the notification (Form No. 6) together with drawings showing the controlled area along with a sketch of the vicinity, in which the said work is carried out, before the said work is started.

(Delivery of Records and Other Information)

Article 61-2.

Employers who make and store the records set forth in Paragraph 2 of Article 9 shall deliver such records to the organization designated by the Minister of Health, Labour and Welfare when dissolving their businesses.

2. Employers who prepare and keep the Ionizing Radiation Medical Examination Cards shall deliver said Cards to the organization designated by the Minister of Health, Labour and Welfare when dissolving their businesses.

(Adjustment)

Article 61-3.

The exposure doses received or that will be received by the radiation workers who are or used to be decontamination workers provided for in Paragraph 3 of Article 2 of the Ordinance for Decontamination or who are or used to be workers engaged in works under a designated dose rate provided for in Paragraph 4 of the said Article during the decontamination works provided for in Paragraph 9 of the said Article or works under a designated dose rate provided for in Paragraph 10 of the said Article as decontamination workers or workers engaged in works under a designated dose rate shall be considered as the exposure doses received during radiation works.

Article 61-4.

Concerning workers who regularly engage in radiation works and enter the controlled areas, and were workers engaged in decontamination, etc. stated in Paragraph 3 of Article 2 of the Ordinance for Decontamination just before the transfer to the said radiation works, the last medical examinations (limited to those performed within 6 months prior to the day of the transfer to the said works) which the said workers had based on the provisions in Paragraph 1 of Article 20 of the Ordinance for Decontamination shall correspond to medical examinations before the transfer to the said works based on provisions in Paragraph 1 of Article 56.

(Applications to Other Cases)

Article 62.

The provisions of Paragraph 4 of Article 3 (including the applications to the cases of the provisions of Paragraph 3 of Article 15, Paragraph 2 of Article 22, Paragraph 3 of Article 33, Paragraph 2 of Article 36, Paragraph 2 of Article 41-4, and Paragraph 2 of Article 41-8), Paragraph 3 of Article 7, Article 8, Article 9, the text of Paragraph 1 of Article 18 (including the applications to the cases of the provisions of Paragraph 2 of the said Article), Articles 31 and 32, Paragraph 1 of Article 33, Paragraph 1 of Article 34, Paragraph 1 of Article 35 (including the applications of these provisions to the cases of the provisions of Article 41-9 (including the applications with replacement of terms under the provisions of Paragraph 2 of Article 41-10)), Paragraph 1 of Article 36, Articles 38, 39 and 41, Article 41-2 (including the applications of these provisions to the cases of the provisions of Article 41-9), Paragraph 1 of Article41-6, Paragraph 1 of Article 41-7, Paragraph 1 of Article 41-8, Paragraphs 1 and 3 of Article 42, Article 44, Paragraph 1 of Article 45, Paragraph 4 of Article 54, Article 59-2, and Paragraph 1 of Article 61-2 shall be applicable with necessary modifications to the cases of the employer undertaking works other than the radiation works (except employers as described in Paragraph 1 of Article 2 of the Ordinance for Decontamination) and the employees within the workplace where the radiation works are performed.

Attached Table 1 (Those related to Article 2)

Column 1		Column 2	Column 3
Type of radioisotope		Quantities (Bq)	Concentrations (Bq/g)
Radionuclides	Chemical species		
^{3}H		1×10^{9}	1×10^{6}
^{7}Be		1×10^{7}	1×10^{3}
^{10}Be		1×10^{6}	1×10^{4}
^{11}C	Monoxides and dioxides	1×10^{9}	1×10^{1}
^{11}C	Those other than monoxides or dioxides	1×10^{6}	1×10^{1}
^{14}C	Monoxides	1×10^{11}	1×10^{8}
^{14}C	Dioxides	1×10^{11}	1×10^{7}
^{14}C	Those other than monoxides or dioxides	1×10^{7}	1×10^{4}
^{13}N		1×10^{9}	1×10^{2}
^{15}O		1×10^{9}	1×10^{2}
^{18}F		1×10^{6}	1×10^{1}
^{19}Ne		1×10^{9}	1×10^{2}
^{22}Na		1×10^{6}	1×10^{1}
^{24}Na		1×10^{5}	1×10^{1}
^{28}Mg	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{26}Al		1×10^{5}	1×10^{1}
^{31}Si		1×10^{6}	1×10^{3}
^{32}Si		1×10^{6}	1×10^{3}
^{32}P		1×10^{5}	1×10^{3}
^{33}P		1×10^{8}	1×10^{5}
^{35}S	Vapor	1×10^{9}	1×10^{6}
^{35}S	Those other than vapor	1×10^{8}	1×10^{5}

^{36}Cl		1×10^{6}	1×10^{4}
^{38}Cl		1×10^{5}	1×10^{1}
^{39}Cl		1×10^{5}	1×10^{1}
^{37}Ar		1×10^{8}	1×10^{6}
^{39}Ar		1×10^{4}	1×10^{7}
^{41}Ar		1×10^{9}	1×10^{2}
^{40}K		1×10^{6}	1×10^{2}
^{42}K		1×10^{6}	1×10^{2}
^{43}K		1×10^{6}	1×10^{1}
^{44}K		1×10^{5}	1×10^{1}
^{45}K		1×10^{5}	1×10^{1}
^{41}Ca		1×10^{7}	1×10^{5}
^{45}Ca		1×10^{7}	1×10^{4}
^{47}Ca		1×10^{6}	1×10^{1}
^{43}Sc		1×10^{6}	1×10^{1}
^{44}Sc		1×10^{5}	1×10^{1}
^{44m}Sc		1×10^{7}	1×10^{2}
^{46}Sc		1×10^{6}	1×10^{1}
^{47}Sc		1×10^{6}	1×10^{2}
^{48}Sc		1×10^{5}	1×10^{1}
^{49}Sc		1×10^{5}	1×10^{3}
^{44}Ti	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{45}Ti		1×10^{6}	1×10^{1}
^{47}V		1×10^{5}	1×10^{1}
^{48}V		1×10^{5}	1×10^{1}
^{49}V		1×10^{7}	1×10^{4}
^{48}Cr		1×10^{6}	1×10^{2}
^{49}Cr		1×10^{6}	1×10^{1}

^{51}Cr		1×10^{7}	1×10^{3}
^{51}Mn		1×10^{5}	1×10^{1}
^{52}Mn		1×10^{5}	1×10^{1}
^{52m}Mn		1×10^{5}	1×10^{1}
^{53}Mn		1×10^{9}	1×10^{4}
^{54}Mn		1×10^{6}	1×10^{1}
^{56}Mn		1×10^{5}	1×10^{1}
^{52}Fe		1×10^{6}	1×10^{1}
^{55}Fe		1×10^{6}	1×10^{4}
^{59}Fe		1×10^{6}	1×10^{1}
^{60}Fe	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{2}
^{55}Co		1×10^{6}	1×10^{1}
^{56}Co		1×10^{5}	1×10^{1}
^{57}Co		1×10^{6}	1×10^{2}
^{58}Co		1×10^{6}	1×10^{1}
^{58m}Co		1×10^{7}	1×10^{4}
^{60}Co		1×10^{5}	1×10^{1}
^{60m}Co		1×10^{6}	1×10^{3}
^{61}Co		1×10^{6}	1×10^{2}
^{62m}Co		1×10^{5}	1×10^{1}
^{56}Ni		1×10^{6}	1×10^{1}
^{57}Ni		1×10^{6}	1×10^{1}
^{59}Ni		1×10^{8}	1×10^{4}
^{63}Ni		1×10^{8}	1×10^{5}
^{65}Ni		1×10^{6}	1×10^{1}
^{66}Ni		1×10^{7}	1×10^{4}
^{60}Cu		1×10^{5}	1×10^{1}
^{61}Cu		1×10^{6}	1×10^{1}

^{64}Cu		1×10^{6}	1×10^{2}
^{67}Cu		1×10^{6}	1×10^{2}
^{62}Zn		1×10^{6}	1×10^{2}
^{63}Zn		1×10^{5}	1×10^{1}
^{65}Zn		1×10^{6}	1×10^{1}
^{69}Zn		1×10^{6}	1×10^{4}
^{69m}Zn		1×10^{6}	1×10^{2}
^{71m}Zn		1×10^{6}	1×10^{1}
^{72}Zn		1×10^{6}	1×10^{2}
^{65}Ga		1×10^{5}	1×10^{1}
^{66}Ga		1×10^{5}	1×10^{1}
^{67}Ga		1×10^{6}	1×10^{2}
^{68}Ga		1×10^{5}	1×10^{1}
^{70}Ga		1×10^{6}	1×10^{3}
^{72}Ga		1×10^{5}	1×10^{1}
^{73}Ga		1×10^{6}	1×10^{2}
^{66}Ge		1×10^{6}	1×10^{1}
^{67}Ge		1×10^{5}	1×10^{1}
^{68}Ge	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{69}Ge		1×10^{6}	1×10^{1}
^{71}Ge		1×10^{8}	1×10^{4}
^{75}Ge		1×10^{6}	1×10^{3}
^{77}Ge		1×10^{5}	1×10^{1}
^{78}Ge		1×10^{6}	1×10^{2}
^{69}As		1×10^{5}	1×10^{1}
^{70}As		1×10^{5}	1×10^{1}
^{71}As		1×10^{6}	1×10^{1}
^{72}As		1×10^{5}	1×10^{1}

^{73}As		1×10^{7}	1×10^{3}
^{74}As		1×10^{6}	1×10^{1}
^{76}As		1×10^{5}	1×10^{2}
^{77}As		1×10^{6}	1×10^{3}
^{78}As		1×10^{5}	1×10^{1}
^{70}Se		1×10^{6}	1×10^{1}
^{73}Se		1×10^{6}	1×10^{1}
^{73m}Se		1×10^{6}	1×10^{2}
^{75}Se		1×10^{6}	1×10^{2}
^{79}Se		1×10^{7}	1×10^{4}
^{81}Se		1×10^{6}	1×10^{3}
^{81m}Se		1×10^{7}	1×10^{3}
^{83}Se		1×10^{5}	1×10^{1}
^{74}Br		1×10^{5}	1×10^{1}
^{74m}Br		1×10^{5}	1×10^{1}
^{75}Br		1×10^{6}	1×10^{1}
^{76}Br		1×10^{5}	1×10^{1}
^{77}Br		1×10^{6}	1×10^{2}
^{80}Br		1×10^{5}	1×10^{2}
^{80m}Br		1×10^{7}	1×10^{3}
^{82}Br		1×10^{6}	1×10^{1}
^{83}Br		1×10^{6}	1×10^{3}
^{84}Br		1×10^{5}	1×10^{1}
^{74}Kr		1×10^{9}	1×10^{2}
^{76}Kr		1×10^{9}	1×10^{2}
^{77}Kr		1×10^{9}	1×10^{2}
^{79}Kr		1×10^{5}	1×10^{3}
^{81}Kr		1×10^{7}	1×10^{4}
^{81m}Kr		1×10^{10}	1×10^{3}

^{83m}Kr		1×10^{12}	1×10^{5}
^{85}Kr		1×10^{4}	1×10^{5}
^{85m}Kr		1×10^{10}	1×10^{3}
^{87}Kr		1×10^{9}	1×10^{2}
^{88}Kr		1×10^{9}	1×10^{2}
^{79}Rb		1×10^{5}	1×10^{1}
^{81}Rb		1×10^{6}	1×10^{1}
^{81m}Rb		1×10^{7}	1×10^{3}
^{82m}Rb		1×10^{6}	1×10^{1}
^{83}Rb	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{2}
^{84}Rb		1×10^{6}	1×10^{1}
^{86}Rb		1×10^{5}	1×10^{2}
^{87}Rb		1×10^{7}	1×10^{4}
^{88}Rb		1×10^{5}	1×10^{1}
^{89}Rb		1×10^{5}	1×10^{1}
^{80}Sr		1×10^{7}	1×10^{3}
^{81}Sr		1×10^{5}	1×10^{1}
^{82}Sr	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{83}Sr		1×10^{6}	1×10^{1}
^{85}Sr		1×10^{6}	1×10^{2}
^{85m}Sr		1×10^{7}	1×10^{2}
^{87m}Sr		1×10^{6}	1×10^{2}
^{89}Sr		1×10^{6}	1×10^{3}
^{90}Sr	Including progeny nuclides at radioactive equilibrium	1×10^{4}	1×10^{2}
^{91}Sr		1×10^{5}	1×10^{1}
^{92}Sr		1×10^{6}	1×10^{1}

^{86}Y		1×10^{5}	1×10^{1}
^{86m}Y		1×10^{7}	1×10^{2}
^{87}Y	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{1}
^{88}Y		1×10^{6}	1×10^{1}
^{90}Y		1×10^{5}	1×10^{3}
^{90m}Y		1×10^{6}	1×10^{1}
^{91}Y		1×10^{6}	1×10^{3}
^{91m}Y		1×10^{6}	1×10^{2}
^{92}Y		1×10^{5}	1×10^{2}
^{93}Y		1×10^{5}	1×10^{2}
^{94}Y		1×10^{5}	1×10^{1}
^{95}Y		1×10^{5}	1×10^{1}
^{86}Zr		1×10^{7}	1×10^{2}
^{88}Zr		1×10^{6}	1×10^{2}
^{89}Zr		1×10^{6}	1×10^{1}
^{93}Zr	Including progeny nuclides at radioactive equilibrium	1×10^{7}	1×10^{3}
^{95}Zr		1×10^{6}	1×10^{1}
^{97}Zr	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{88}Nb		1×10^{5}	1×10^{1}
^{89}Nb		1×10^{5}	1×10^{1}
^{90}Nb		1×10^{5}	1×10^{1}
^{93m}Nb		1×10^{7}	1×10^{4}
^{94}Nb		1×10^{6}	1×10^{1}
^{95}Nb		1×10^{6}	1×10^{1}
^{95m}Nb		1×10^{7}	1×10^{2}
^{96}Nb		1×10^{5}	1×10^{1}

^{97}Nb		1×10^{6}	1×10^{1}
^{98}Nb		1×10^{5}	1×10^{1}
^{90}Mo		1×10^{6}	1×10^{1}
^{93}Mo		1×10^{8}	1×10^{3}
^{93m}Mo		1×10^{6}	1×10^{1}
^{99}Mo		1×10^{6}	1×10^{2}
^{101}Mo		1×10^{6}	1×10^{1}
^{93}Tc		1×10^{6}	1×10^{1}
^{93m}Tc		1×10^{6}	1×10^{1}
^{94}Tc		1×10^{6}	1×10^{1}
^{94m}Tc		1×10^{5}	1×10^{1}
^{95}Tc		1×10^{6}	1×10^{1}
^{95m}Tc	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{1}
^{96}Tc		1×10^{6}	1×10^{1}
^{96m}Tc		1×10^{7}	1×10^{3}
^{97}Tc		1×10^{8}	1×10^{3}
^{97m}Tc		1×10^{7}	1×10^{3}
^{98}Tc		1×10^{6}	1×10^{1}
^{99}Tc		1×10^{7}	1×10^{4}
^{99m}Tc		1×10^{7}	1×10^{2}
^{101}Tc		1×10^{6}	1×10^{2}
^{104}Tc		1×10^{5}	1×10^{1}
^{94}Ru		1×10^{6}	1×10^{2}
^{97}Ru		1×10^{7}	1×10^{2}
^{103}Ru		1×10^{6}	1×10^{2}
^{105}Ru		1×10^{6}	1×10^{1}
^{106}Ru	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{2}

^{99}Rh		1×10^{6}	1×10^{1}
^{99m}Rh		1×10^{6}	1×10^{1}
^{100}Rh		1×10^{6}	1×10^{1}
^{101}Rh		1×10^{7}	1×10^{2}
^{101m}Rh		1×10^{7}	1×10^{2}
^{102}Rh		1×10^{6}	1×10^{1}
^{102m}Rh		1×10^{6}	1×10^{2}
^{103m}Rh		1×10^{8}	1×10^{4}
^{105}Rh		1×10^{7}	1×10^{2}
^{106m}Rh		1×10^{5}	1×10^{1}
^{107}Rh		1×10^{6}	1×10^{2}
^{100}Pd		1×10^{7}	1×10^{2}
^{101}Pd		1×10^{6}	1×10^{2}
^{103}Pd		1×10^{8}	1×10^{3}
^{107}Pd		1×10^{8}	1×10^{5}
^{109}Pd		1×10^{6}	1×10^{3}
^{102}Ag		1×10^{5}	1×10^{1}
^{103}Ag		1×10^{6}	1×10^{1}
^{104}Ag		1×10^{6}	1×10^{1}
^{104m}Ag		1×10^{6}	1×10^{1}
^{105}Ag		1×10^{6}	1×10^{2}
^{106}Ag		1×10^{6}	1×10^{1}
^{106m}Ag		1×10^{6}	1×10^{1}
^{108m}Ag	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{1}
^{110m}Ag		1×10^{6}	1×10^{1}
^{111}Ag		1×10^{6}	1×10^{3}
^{112}Ag		1×10^{5}	1×10^{1}
^{115}Ag		1×10^{5}	1×10^{1}

^{104}Cd		1×10^{7}	1×10^{2}
^{107}Cd		1×10^{7}	1×10^{3}
^{109}Cd		1×10^{6}	1×10^{4}
^{113}Cd		1×10^{6}	1×10^{3}
^{113m}Cd		1×10^{6}	1×10^{3}
^{115}Cd		1×10^{6}	1×10^{2}
^{115m}Cd		1×10^{6}	1×10^{3}
^{117}Cd		1×10^{6}	1×10^{1}
^{117m}Cd		1×10^{6}	1×10^{1}
^{109}In		1×10^{6}	1×10^{1}
^{110}In	Those with physical half-life of 4.90 hours	1×10^{6}	1×10^{1}
^{110}In	Those with physical half-life of 1.15 hours	1×10^{5}	1×10^{1}
^{111}In		1×10^{6}	1×10^{2}
^{112}In		1×10^{6}	1×10^{2}
^{113m}In		1×10^{6}	1×10^{2}
^{114}In		1×10^{5}	1×10^{3}
^{114m}In		1×10^{6}	1×10^{2}
^{115}In		1×10^{5}	1×10^{3}
^{115m}In		1×10^{6}	1×10^{2}
^{116m}In		1×10^{5}	1×10^{1}
^{117}In		1×10^{6}	1×10^{1}
^{117m}In		1×10^{6}	1×10^{2}
^{119m}In		1×10^{5}	1×10^{2}
^{110}Sn		1×10^{7}	1×10^{2}
^{111}Sn		1×10^{6}	1×10^{2}
^{113}Sn		1×10^{7}	1×10^{3}
^{117m}Sn		1×10^{6}	1×10^{2}

^{119m}Sn		1×10^{7}	1×10^{3}
^{121}Sn		1×10^{7}	1×10^{5}
^{121m}Sn	Including progeny nuclides at radioactive equilibrium	1×10^{7}	1×10^{3}
^{123}Sn		1×10^{6}	1×10^{3}
^{123m}Sn		1×10^{6}	1×10^{2}
^{125}Sn		1×10^{5}	1×10^{2}
^{126}Sn	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{127}Sn		1×10^{6}	1×10^{1}
^{128}Sn		1×10^{6}	1×10^{1}
^{115}Sb		1×10^{6}	1×10^{1}
^{116}Sb		1×10^{6}	1×10^{1}
^{116m}Sb		1×10^{5}	1×10^{1}
^{117}Sb		1×10^{7}	1×10^{2}
^{118m}Sb		1×10^{6}	1×10^{1}
^{119}Sb		1×10^{7}	1×10^{3}
^{120}Sb	Those with physical half-life of 5.76 days	1×10^{6}	1×10^{1}
^{120}Sb	Those with physical half-life of 0.265 hours	1×10^{6}	1×10^{2}
^{122}Sb		1×10^{4}	1×10^{2}
^{124}Sb		1×10^{6}	1×10^{1}
^{124m}Sb		1×10^{6}	1×10^{2}
^{125}Sb		1×10^{6}	1×10^{2}
^{126}Sb		1×10^{5}	1×10^{1}
^{126m}Sb		1×10^{5}	1×10^{1}
^{127}Sb		1×10^{6}	1×10^{1}
^{128}Sb		1×10^{5}	1×10^{1}

^{129}Sb		1×10^{6}	1×10^{1}
^{130}Sb		1×10^{5}	1×10^{1}
^{131}Sb		1×10^{6}	1×10^{1}
^{116}Te		1×10^{7}	1×10^{2}
^{121}Te		1×10^{6}	1×10^{1}
^{121m}Te		1×10^{6}	1×10^{2}
^{123}Te		1×10^{6}	1×10^{3}
^{123m}Te		1×10^{7}	1×10^{2}
^{125m}Te		1×10^{7}	1×10^{3}
^{127}Te		1×10^{6}	1×10^{3}
^{127m}Te		1×10^{7}	1×10^{3}
^{129}Te		1×10^{6}	1×10^{2}
^{129m}Te		1×10^{6}	1×10^{3}
^{131}Te		1×10^{5}	1×10^{2}
^{131m}Te		1×10^{6}	1×10^{1}
^{132}Te		1×10^{7}	1×10^{2}
^{133}Te		1×10^{5}	1×10^{1}
^{133m}Te		1×10^{5}	1×10^{1}
^{134}Te		1×10^{6}	1×10^{1}
^{120}I		1×10^{5}	1×10^{1}
^{120m}I		1×10^{5}	1×10^{1}
^{121}I		1×10^{6}	1×10^{2}
^{123}I		1×10^{7}	1×10^{2}
^{124}I		1×10^{6}	1×10^{1}
^{125}I		1×10^{6}	1×10^{3}
^{126}I		1×10^{6}	1×10^{2}
^{128}I		1×10^{5}	1×10^{2}
^{129}I		1×10^{5}	1×10^{2}
^{130}I		1×10^{6}	1×10^{1}

^{131}I		1×10^{6}	1×10^{2}
^{132}I		1×10^{5}	1×10^{1}
^{132m}I		1×10^{6}	1×10^{2}
^{133}I		1×10^{6}	1×10^{1}
^{134}I		1×10^{5}	1×10^{1}
^{135}I		1×10^{6}	1×10^{1}
^{120}Xe		1×10^{9}	1×10^{2}
^{121}Xe		1×10^{9}	1×10^{2}
^{122}Xe	Including progeny nuclides at radioactive equilibrium	1×10^{9}	1×10^{2}
^{123}Xe		1×10^{9}	1×10^{2}
^{125}Xe		1×10^{9}	1×10^{3}
^{127}Xe		1×10^{5}	1×10^{3}
^{129m}Xe		1×10^{4}	1×10^{3}
^{131m}Xe		1×10^{4}	1×10^{4}
^{133}Xe		1×10^{4}	1×10^{3}
^{133m}Xe		1×10^{4}	1×10^{3}
^{135}Xe		1×10^{10}	1×10^{3}
^{135m}Xe		1×10^{9}	1×10^{2}
^{138}Xe		1×10^{9}	1×10^{2}
^{125}Cs		1×10^{4}	1×10^{1}
^{127}Cs		1×10^{5}	1×10^{2}
^{129}Cs		1×10^{5}	1×10^{2}
^{130}Cs		1×10^{6}	1×10^{2}
^{131}Cs		1×10^{6}	1×10^{3}
^{132}Cs		1×10^{5}	1×10^{1}
^{134}Cs		1×10^{4}	1×10^{1}
^{134m}Cs		1×10^{5}	1×10^{3}
^{135}Cs		1×10^{7}	1×10^{4}

^{135m}Cs		1×10^{6}	1×10^{1}
^{136}Cs		1×10^{5}	1×10^{1}
^{137}Cs	Including progeny nuclides at radioactive equilibrium	1×10^{4}	1×10^{1}
^{138}Cs		1×10^{4}	1×10^{1}
^{126}Ba		1×10^{7}	1×10^{2}
^{128}Ba		1×10^{7}	1×10^{2}
^{131}Ba		1×10^{6}	1×10^{2}
^{131m}Ba		1×10^{7}	1×10^{2}
^{133}Ba		1×10^{6}	1×10^{2}
^{133m}Ba		1×10^{6}	1×10^{2}
^{135m}Ba		1×10^{6}	1×10^{2}
^{137m}Ba		1×10^{6}	1×10^{1}
^{139}Ba		1×10^{5}	1×10^{2}
^{140}Ba	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{141}Ba		1×10^{5}	1×10^{1}
^{142}Ba		1×10^{6}	1×10^{1}
^{131}La		1×10^{6}	1×10^{1}
^{132}La		1×10^{6}	1×10^{1}
^{135}La		1×10^{7}	1×10^{3}
^{137}La		1×10^{7}	1×10^{3}
^{138}La		1×10^{6}	1×10^{1}
^{140}La		1×10^{5}	1×10^{1}
^{141}La		1×10^{5}	1×10^{2}
^{142}La		1×10^{5}	1×10^{1}
^{143}La		1×10^{5}	1×10^{2}
^{134}Ce		1×10^{7}	1×10^{3}
^{135}Ce		1×10^{6}	1×10^{1}

^{137}Ce		1×10^{7}	1×10^{3}
^{137m}Ce		1×10^{6}	1×10^{3}
^{139}Ce		1×10^{6}	1×10^{2}
^{141}Ce		1×10^{7}	1×10^{2}
^{143}Ce		1×10^{6}	1×10^{2}
^{144}Ce	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{2}
^{136}Pr		1×10^{5}	1×10^{1}
^{137}Pr		1×10^{6}	1×10^{2}
^{138m}Pr		1×10^{6}	1×10^{1}
^{139}Pr		1×10^{7}	1×10^{2}
^{142}Pr		1×10^{5}	1×10^{2}
^{142m}Pr		1×10^{9}	1×10^{7}
^{143}Pr		1×10^{6}	1×10^{4}
^{144}Pr		1×10^{5}	1×10^{2}
^{145}Pr		1×10^{5}	1×10^{3}
^{147}Pr		1×10^{5}	1×10^{1}
^{136}Nd		1×10^{6}	1×10^{2}
^{138}Nd		1×10^{7}	1×10^{3}
^{139}Nd		1×10^{6}	1×10^{2}
^{139m}Nd		1×10^{6}	1×10^{1}
^{141}Nd		1×10^{7}	1×10^{2}
^{147}Nd		1×10^{6}	1×10^{2}
^{149}Nd		1×10^{6}	1×10^{2}
^{151}Nd		1×10^{5}	1×10^{1}
^{141}Pm		1×10^{5}	1×10^{1}
^{143}Pm		1×10^{6}	1×10^{2}
^{144}Pm		1×10^{6}	1×10^{1}
^{145}Pm		1×10^{7}	1×10^{3}

^{146}Pm		1×10^{6}	1×10^{1}
^{147}Pm		1×10^{7}	1×10^{4}
^{148}Pm		1×10^{5}	1×10^{1}
^{148m}Pm	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{1}
^{149}Pm		1×10^{6}	1×10^{3}
^{150}Pm		1×10^{5}	1×10^{1}
^{151}Pm		1×10^{6}	1×10^{2}
^{141}Sm		1×10^{5}	1×10^{1}
^{141m}Sm		1×10^{6}	1×10^{1}
^{142}Sm		1×10^{7}	1×10^{2}
^{145}Sm		1×10^{7}	1×10^{2}
^{146}Sm		1×10^{5}	1×10^{1}
^{147}Sm	Those artificially changed to ^{147}Sm from naturally occurring samarium	1×10^{4}	1×10^{1}
^{147}Sm	Those not artificially changed to ^{147}Sm from naturally occurring samarium	1×10^{4}	1.3×10^{2}
^{151}Sm		1×10^{8}	1×10^{4}
^{153}Sm		1×10^{6}	1×10^{2}
^{155}Sm		1×10^{6}	1×10^{2}
^{156}Sm		1×10^{6}	1×10^{2}
^{145}Eu		1×10^{6}	1×10^{1}
^{146}Eu		1×10^{6}	1×10^{1}
^{147}Eu		1×10^{6}	1×10^{2}
^{148}Eu		1×10^{6}	1×10^{1}
^{149}Eu		1×10^{7}	1×10^{2}
^{150}Eu	Those with physical half-life of 34.2 years	1×10^{6}	1×10^{1}
^{150}Eu	Those with physical half-life of 12.6 hours	1×10^{6}	1×10^{3}

^{152}Eu		1×10^{6}	1×10^{1}
^{152m}Eu		1×10^{6}	1×10^{2}
^{154}Eu		1×10^{6}	1×10^{1}
^{155}Eu		1×10^{7}	1×10^{2}
^{156}Eu		1×10^{6}	1×10^{1}
^{157}Eu		1×10^{6}	1×10^{2}
^{158}Eu		1×10^{5}	1×10^{1}
^{145}Gd		1×10^{5}	1×10^{1}
^{146}Gd	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{1}
^{147}Gd		1×10^{6}	1×10^{1}
^{148}Gd		1×10^{4}	1×10^{1}
^{149}Gd		1×10^{6}	1×10^{2}
^{151}Gd		1×10^{7}	1×10^{2}
^{152}Gd		1×10^{4}	1×10^{1}
^{153}Gd		1×10^{7}	1×10^{2}
^{159}Gd		1×10^{6}	1×10^{3}
^{147}Tb		1×10^{6}	1×10^{1}
^{149}Tb		1×10^{6}	1×10^{1}
^{150}Tb		1×10^{6}	1×10^{1}
^{151}Tb		1×10^{6}	1×10^{1}
^{153}Tb		1×10^{7}	1×10^{2}
^{154}Tb		1×10^{6}	1×10^{1}
^{155}Tb		1×10^{7}	1×10^{2}
^{156}Tb		1×10^{6}	1×10^{1}
^{156m}Tb	Those with physical half-life of 1.02 days	1×10^{7}	1×10^{3}
^{156m}Tb	Those with physical half-life of 5.00 hours	1×10^{7}	1×10^{4}

^{157}Tb		1×10^{7}	1×10^{4}
^{158}Tb		1×10^{6}	1×10^{1}
^{160}Tb		1×10^{6}	1×10^{1}
^{161}Tb		1×10^{6}	1×10^{3}
^{155}Dy		1×10^{6}	1×10^{1}
^{157}Dy		1×10^{6}	1×10^{2}
^{159}Dy		1×10^{7}	1×10^{3}
^{165}Dy		1×10^{6}	1×10^{3}
^{166}Dy		1×10^{6}	1×10^{3}
^{155}Ho		1×10^{6}	1×10^{2}
^{157}Ho		1×10^{6}	1×10^{2}
^{159}Ho		1×10^{6}	1×10^{2}
^{161}Ho		1×10^{7}	1×10^{2}
^{162}Ho		1×10^{7}	1×10^{2}
^{162m}Ho		1×10^{6}	1×10^{1}
^{164}Ho		1×10^{6}	1×10^{3}
^{164m}Ho		1×10^{7}	1×10^{3}
^{166}Ho		1×10^{5}	1×10^{3}
^{166m}Ho		1×10^{6}	1×10^{1}
^{167}Ho		1×10^{6}	1×10^{2}
^{161}Er		1×10^{6}	1×10^{1}
^{165}Er		1×10^{7}	1×10^{3}
^{169}Er		1×10^{7}	1×10^{4}
^{171}Er		1×10^{6}	1×10^{2}
^{172}Er		1×10^{6}	1×10^{2}
^{162}Tm		1×10^{6}	1×10^{1}
^{166}Tm		1×10^{6}	1×10^{1}
^{167}Tm		1×10^{6}	1×10^{2}
^{170}Tm		1×10^{6}	1×10^{3}

^{171}Tm		1×10^{8}	1×10^{4}
^{172}Tm		1×10^{6}	1×10^{2}
^{173}Tm		1×10^{6}	1×10^{2}
^{175}Tm		1×10^{6}	1×10^{1}
^{162}Yb		1×10^{7}	1×10^{2}
^{166}Yb		1×10^{7}	1×10^{2}
^{167}Yb		1×10^{6}	1×10^{2}
^{169}Yb		1×10^{7}	1×10^{2}
^{175}Yb		1×10^{7}	1×10^{3}
^{177}Yb		1×10^{6}	1×10^{2}
^{178}Yb		1×10^{6}	1×10^{3}
^{169}Lu		1×10^{6}	1×10^{1}
^{170}Lu		1×10^{6}	1×10^{1}
^{171}Lu		1×10^{6}	1×10^{1}
^{172}Lu		1×10^{6}	1×10^{1}
^{173}Lu		1×10^{7}	1×10^{2}
^{174}Lu		1×10^{7}	1×10^{2}
^{174m}Lu		1×10^{7}	1×10^{2}
^{176}Lu		1×10^{6}	1×10^{2}
^{176m}Lu		1×10^{6}	1×10^{3}
^{177}Lu		1×10^{7}	1×10^{3}
^{177m}Lu		1×10^{6}	1×10^{1}
^{178}Lu		1×10^{5}	1×10^{2}
^{178m}Lu		1×10^{5}	1×10^{1}
^{179}Lu		1×10^{6}	1×10^{3}
^{170}Hf		1×10^{6}	1×10^{2}
^{172}Hf	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{1}
^{173}Hf		1×10^{6}	1×10^{2}

^{175}Hf		1×10^{6}	1×10^{2}
^{177m}Hf		1×10^{5}	1×10^{1}
^{178m}Hf		1×10^{6}	1×10^{1}
^{179m}Hf		1×10^{6}	1×10^{1}
^{180m}Hf		1×10^{6}	1×10^{1}
^{181}Hf		1×10^{6}	1×10^{1}
^{182}Hf		1×10^{6}	1×10^{2}
^{182m}Hf		1×10^{6}	1×10^{1}
^{183}Hf		1×10^{6}	1×10^{1}
^{184}Hf		1×10^{6}	1×10^{2}
^{172}Ta		1×10^{6}	1×10^{1}
^{173}Ta		1×10^{6}	1×10^{1}
^{174}Ta		1×10^{6}	1×10^{1}
^{175}Ta		1×10^{6}	1×10^{1}
^{176}Ta		1×10^{6}	1×10^{1}
^{177}Ta		1×10^{7}	1×10^{2}
^{178}Ta		1×10^{6}	1×10^{1}
^{179}Ta		1×10^{7}	1×10^{3}
^{180}Ta		1×10^{6}	1×10^{1}
^{180m}Ta		1×10^{7}	1×10^{3}
^{182}Ta		1×10^{4}	1×10^{1}
^{182m}Ta		1×10^{6}	1×10^{2}
^{183}Ta		1×10^{6}	1×10^{2}
^{184}Ta		1×10^{6}	1×10^{1}
^{185}Ta		1×10^{5}	1×10^{2}
^{186}Ta		1×10^{5}	1×10^{1}
^{176}W		1×10^{6}	1×10^{2}
^{177}W		1×10^{6}	1×10^{1}
^{178}W	Including progeny nuclides at	1×10^{6}	1×10^{1}

	radioactive equilibrium		
^{179}W		1×10^{7}	1×10^{2}
^{181}W		1×10^{7}	1×10^{3}
^{185}W		1×10^{7}	1×10^{4}
^{187}W		1×10^{6}	1×10^{2}
^{188}W	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{2}
^{177}Re		1×10^{6}	1×10^{1}
^{178}Re		1×10^{6}	1×10^{1}
^{181}Re		1×10^{6}	1×10^{1}
^{182}Re		1×10^{6}	1×10^{1}
^{184}Re		1×10^{6}	1×10^{1}
^{184m}Re		1×10^{6}	1×10^{2}
^{186}Re		1×10^{6}	1×10^{3}
^{186m}Re		1×10^{7}	1×10^{3}
^{187}Re		1×10^{9}	1×10^{6}
^{188}Re		1×10^{5}	1×10^{2}
^{188m}Re		1×10^{7}	1×10^{2}
^{189}Re	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{2}
^{180}Os		1×10^{7}	1×10^{2}
^{181}Os		1×10^{6}	1×10^{1}
^{182}Os		1×10^{6}	1×10^{2}
^{185}Os		1×10^{6}	1×10^{1}
^{189m}Os		1×10^{7}	1×10^{4}
^{191}Os		1×10^{7}	1×10^{2}
^{191m}Os		1×10^{7}	1×10^{3}
^{193}Os		1×10^{6}	1×10^{2}
^{194}Os	Including progeny nuclides at	1×10^{5}	1×10^{2}

	radioactive equilibrium		
^{182}Ir		1×10^{5}	1×10^{1}
^{184}Ir		1×10^{6}	1×10^{1}
^{185}Ir		1×10^{6}	1×10^{1}
^{186}Ir		1×10^{6}	1×10^{1}
^{187}Ir		1×10^{6}	1×10^{2}
^{188}Ir		1×10^{6}	1×10^{1}
^{189}Ir	Including progeny nuclides at radioactive equilibrium	1×10^{7}	1×10^{2}
^{190}Ir		1×10^{6}	1×10^{1}
^{190m}Ir	Those with physical half-life of 3.10 hours	1×10^{6}	1×10^{1}
^{190m}Ir	Those with physical half-life of 1.20 hours	1×10^{7}	1×10^{4}
^{192}Ir		1×10^{4}	1×10^{1}
^{192m}Ir		1×10^{7}	1×10^{2}
^{193m}Ir		1×10^{7}	1×10^{4}
^{194}Ir		1×10^{5}	1×10^{2}
^{194m}Ir		1×10^{6}	1×10^{1}
^{195}Ir		1×10^{6}	1×10^{2}
^{195m}Ir		1×10^{6}	1×10^{2}
^{186}Pt		1×10^{6}	1×10^{1}
^{188}Pt	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{1}
^{189}Pt		1×10^{6}	1×10^{2}
^{191}Pt		1×10^{6}	1×10^{2}
^{193}Pt		1×10^{7}	1×10^{4}
^{193m}Pt		1×10^{7}	1×10^{3}
^{195m}Pt		1×10^{6}	1×10^{2}

^{197}Pt		1×10^{6}	1×10^{3}
^{197m}Pt		1×10^{6}	1×10^{2}
^{199}Pt		1×10^{6}	1×10^{2}
^{200}Pt		1×10^{6}	1×10^{2}
^{193}Au		1×10^{7}	1×10^{2}
^{194}Au		1×10^{6}	1×10^{1}
^{195}Au		1×10^{7}	1×10^{2}
^{198}Au		1×10^{6}	1×10^{2}
^{198m}Au		1×10^{6}	1×10^{1}
^{199}Au		1×10^{6}	1×10^{2}
^{200}Au		1×10^{5}	1×10^{2}
^{200m}Au		1×10^{6}	1×10^{1}
^{201}Au		1×10^{6}	1×10^{2}
^{193}Hg		1×10^{6}	1×10^{2}
^{193m}Hg		1×10^{6}	1×10^{1}
^{194}Hg	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{1}
^{195}Hg		1×10^{6}	1×10^{2}
^{195m}Hg	Including progeny nuclides at radioactive equilibrium	1×10^{6}	1×10^{2}
^{197}Hg		1×10^{7}	1×10^{2}
^{197m}Hg		1×10^{6}	1×10^{2}
^{199m}Hg		1×10^{6}	1×10^{2}
^{203}Hg		1×10^{5}	1×10^{2}
^{194}Tl		1×10^{6}	1×10^{1}
^{194m}Tl		1×10^{6}	1×10^{1}
^{195}Tl		1×10^{6}	1×10^{1}
^{197}Tl		1×10^{6}	1×10^{2}
^{198}Tl		1×10^{6}	1×10^{1}

^{198m}Tl		1×10^{6}	1×10^{1}
^{199}Tl		1×10^{6}	1×10^{2}
^{200}Tl		1×10^{6}	1×10^{1}
^{201}Tl		1×10^{6}	1×10^{2}
^{202}Tl		1×10^{6}	1×10^{2}
^{204}Tl		1×10^{4}	1×10^{4}
^{195m}Pb		1×10^{6}	1×10^{1}
^{198}Pb		1×10^{6}	1×10^{2}
^{199}Pb		1×10^{6}	1×10^{1}
^{200}Pb		1×10^{6}	1×10^{2}
^{201}Pb		1×10^{6}	1×10^{1}
^{202}Pb		1×10^{6}	1×10^{3}
^{202m}Pb		1×10^{6}	1×10^{1}
^{203}Pb		1×10^{6}	1×10^{2}
^{205}Pb		1×10^{7}	1×10^{4}
^{209}Pb		1×10^{6}	1×10^{5}
^{210}Pb	Including progeny nuclides at radioactive equilibrium	1×10^{4}	1×10^{1}
^{211}Pb		1×10^{6}	1×10^{2}
^{212}Pb	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{214}Pb		1×10^{6}	1×10^{2}
^{200}Bi		1×10^{6}	1×10^{1}
^{201}Bi		1×10^{6}	1×10^{1}
^{202}Bi		1×10^{6}	1×10^{1}
^{203}Bi		1×10^{6}	1×10^{1}
^{205}Bi		1×10^{6}	1×10^{1}
^{206}Bi		1×10^{5}	1×10^{1}
^{207}Bi		1×10^{6}	1×10^{1}

^{210}Bi		1×10^{6}	1×10^{3}
^{210m}Bi	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{212}Bi	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{213}Bi		1×10^{6}	1×10^{2}
^{214}Bi		1×10^{5}	1×10^{1}
^{203}Po		1×10^{6}	1×10^{1}
^{205}Po		1×10^{6}	1×10^{1}
^{206}Po		1×10^{6}	1×10^{1}
^{207}Po		1×10^{6}	1×10^{1}
^{208}Po		1×10^{4}	1×10^{1}
^{209}Po		1×10^{4}	1×10^{1}
^{210}Po		1×10^{4}	1×10^{1}
^{207}At		1×10^{6}	1×10^{1}
^{211}At		1×10^{7}	1×10^{3}
^{220}Rn	Including progeny nuclides at radioactive equilibrium	1×10^{7}	1×10^{4}
^{222}Rn	Including progeny nuclides at radioactive equilibrium	1×10^{8}	1×10^{1}
^{222}Fr		1×10^{5}	1×10^{3}
^{223}Fr		1×10^{6}	1×10^{2}
^{223}Ra	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{2}
^{224}Ra	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{225}Ra		1×10^{5}	1×10^{2}
^{226}Ra	Including progeny nuclides at radioactive equilibrium	1×10^{4}	1×10^{1}
^{227}Ra		1×10^{6}	1×10^{2}

^{228}Ra	Including progeny nuclides at radioactive equilibrium	1×10^{5}	1×10^{1}
^{224}AC		1×10^{6}	1×10^{2}
^{225}AC	Including progeny nuclides at radioactive equilibrium	1×10^{4}	1×10^{1}
^{226}AC		1×10^{5}	1×10^{2}
^{227}AC	Including progeny nuclides at radioactive equilibrium	1×10^{3}	1×10^{-1}
^{228}AC		1×10^{6}	1×10^{1}
^{227}Pa		1×10^{6}	1×10^{3}
^{228}Pa		1×10^{6}	1×10^{1}
^{230}Pa		1×10^{6}	1×10^{1}
^{231}Pa		1×10^{3}	1×10^{0}
^{232}Pa		1×10^{6}	1×10^{1}
^{233}Pa		1×10^{7}	1×10^{2}
^{234}Pa		1×10^{6}	1×10^{1}
^{232}Np		1×10^{6}	1×10^{1}
^{233}Np		1×10^{7}	1×10^{2}
^{234}Np		1×10^{6}	1×10^{1}
^{235}Np		1×10^{7}	1×10^{3}
^{236}Np	Those with physical half-life of 1.15×10^{5} years	1×10^{5}	1×10^{2}
^{236}Np	Those with physical half-life of 22.5 hours	1×10^{7}	1×10^{3}
^{237}Np	Including progeny nuclides at radioactive equilibrium	1×10^{3}	1×10^{0}
^{238}Np		1×10^{6}	1×10^{2}
^{239}Np		1×10^{7}	1×10^{2}
^{240}Np		1×10^{6}	1×10^{1}
^{237}Am		1×10^{6}	1×10^{2}

^{238}Am		1×10^{6}	1×10^{1}
^{239}Am		1×10^{6}	1×10^{2}
^{240}Am		1×10^{6}	1×10^{1}
^{241}Am		1×10^{4}	1×10^{0}
^{242}Am		1×10^{6}	1×10^{3}
^{242m}Am	Including progeny nuclides at radioactive equilibrium	1×10^{4}	1×10^{0}
^{243}Am	Including progeny nuclides at radioactive equilibrium	1×10^{3}	1×10^{0}
^{244}Am		1×10^{6}	1×10^{1}
^{244m}Am		1×10^{7}	1×10^{4}
^{245}Am		1×10^{6}	1×10^{3}
^{246}Am		1×10^{5}	1×10^{1}
^{246m}Am		1×10^{6}	1×10^{1}
^{238}Cm		1×10^{7}	1×10^{2}
^{240}Cm		1×10^{5}	1×10^{2}
^{241}Cm		1×10^{6}	1×10^{2}
^{242}Cm		1×10^{5}	1×10^{2}
^{243}Cm		1×10^{4}	1×10^{0}
^{244}Cm		1×10^{4}	1×10^{1}
^{245}Cm		1×10^{3}	1×10^{0}
^{246}Cm		1×10^{3}	1×10^{0}
^{247}Cm		1×10^{4}	1×10^{0}
^{248}Cm		1×10^{3}	1×10^{0}
^{249}Cm		1×10^{6}	1×10^{3}
^{250}Cm		1×10^{3}	1×10^{-1}
^{245}Bk		1×10^{6}	1×10^{2}
^{246}Bk		1×10^{6}	1×10^{1}
^{247}Bk		1×10^{4}	1×10^{0}

^{249}Bk		1×10^{6}	1×10^{3}
^{250}Bk		1×10^{6}	1×10^{1}
^{244}Cf		1×10^{7}	1×10^{4}
^{246}Cf		1×10^{6}	1×10^{3}
^{248}Cf		1×10^{4}	1×10^{1}
^{249}Cf		1×10^{3}	1×10^{0}
^{250}Cf		1×10^{4}	1×10^{1}
^{251}Cf		1×10^{3}	1×10^{0}
^{252}Cf		1×10^{4}	1×10^{1}
^{253}Cf		1×10^{5}	1×10^{2}
^{254}Cf		1×10^{3}	1×10^{0}
^{250}Es		1×10^{6}	1×10^{2}
^{251}Es		1×10^{7}	1×10^{2}
^{253}Es		1×10^{5}	1×10^{2}
^{254}Es		1×10^{4}	1×10^{1}
^{254m}Es		1×10^{6}	1×10^{2}
^{252}Fm		1×10^{6}	1×10^{3}
^{253}Fm		1×10^{6}	1×10^{2}
^{254}Fm		1×10^{7}	1×10^{4}
^{255}Fm		1×10^{6}	1×10^{3}
^{257}Fm		1×10^{5}	1×10^{1}
^{257}Md		1×10^{7}	1×10^{2}
^{258}Md		1×10^{5}	1×10^{2}
Other types of radioisotopes (Excluding those listed in the Attached Table 2)	Those that emit alpha rays	1×10^{3}	1×10^{-1}
	Those that do not emit alpha rays	1×10^{4}	1×10^{-1}

Note

1. The unit of the content: Bq/g means Becquerel per gram
2. The parent nuclides and progeny nuclides to be included in the radioactive equilibrium are listed in the following table for the quantity and concentration listed in column 2 and column 3.

Parent nuclides	Progeny nuclides
^{28}Mg	^{28}Al
^{44}Ti	^{44}Sc
^{60}Fe	^{60m}Co
^{68}Ge	^{68}Ga
^{83}Rb	^{83m}Kr
^{82}Sr	^{82}Rb
^{90}Sr	^{90}Y
^{87}Y	^{87m}Sr
^{93}Zr	^{93m}Nb
^{97}Zr	^{97}Nb
^{95m}Tc	^{95}Tc（0.04）
^{106}Ru	^{106}Rh
^{108m}Ag	^{108}Ag（0.089）
^{121m}Sn	^{121}Sn（0.776）
^{126}Sn	^{126m}Sb
^{122}Xe	^{122}I
^{137}Cs	^{137m}Ba
^{140}Ba	^{140}La
^{144}Ce	^{144}Pr
^{148m}Pm	^{148}Pm（0.046）

^{146}Gd	^{146}Eu
^{172}Hf	^{172}Lu
^{178}W	^{178}Ta
^{188}W	^{188}Re
^{189}Re	^{189m}Os（0.241）
^{194}Os	^{194}Ir
^{189}Ir	^{189m}Os
^{188}Pt	^{188}Ir
^{194}Hg	^{194}Au
^{195m}Hg	^{195}Hg（0.542）
^{210}Pb	^{210}Bi、^{210}Po
^{212}Pb	^{212}Bi、^{208}Tl（0.36）、^{212}Po（0.64）
^{210m}Bi	^{206}Tl
^{212}Bi	^{208}Tl（0.36）、^{212}Po（0.64）
^{220}Rn	^{216}Po
^{222}Rn	^{218}Po、^{214}Pb、^{214}Bi、^{214}Po
^{223}Ra	^{219}Rn、^{215}Po、^{211}Pb、^{211}Bi、^{207}Tl
^{224}Ra	^{220}Rn、^{216}Po、^{212}Pb、^{212}Bi、^{208}Tl（0.36）、^{212}Po（0.64）
^{226}Ra	^{222}Rn、^{218}Po、^{214}Pb、^{214}Bi、^{214}Po、^{210}Pb、^{210}Bi、^{210}Po
^{228}Ra	^{228}Ac
^{225}Ac	^{221}Fr、^{217}At、^{213}Bi、^{213}Po（0.978）、^{209}Tl（0.0216）、^{209}Pb（0.978）
^{227}Ac	^{223}Fr（0.0138）
^{237}Np	^{233}Pa
^{242m}Am	^{242}Am
^{243}Am	^{239}Np

Attached Table 2 (an issue related to Article 2)

Column 1	Column 2
Type of radioisotope	Quantities（Bq）
Th	3.7×10^{6}
U	3.7×10^{6}
Pu	3.7×10^{3} (Note 3.7×10^{5} is the quantity for ^{243}Pu, ^{245}Pu and ^{246}Pu)

Attached Table 3 (Refer to Articles 3, 28, 29, 30, 31, 32, 33, 39, 41 and 44)

Limits on Surface Contamination

Classification	Limit (Bq/cm^2)
Radioisotopes emitting alpha-rays	4
Radioisotopes not emitting alpha-rays	40

Remarks: Unit of limit: Bq/cm^2 (Becquerels per square centimeter)