

Tokyo Metropolitan University
Minami-Osawa Campus
Regulations for Prevention of Radiation
Hazards

Tokyo Metropolitan University

Table of Contents

(Purpose) Article 1	4
(Scope of Application) Article 2	4
(Compliance and Other Duties) Article 3	4
(Organizations) Article 4	4
(Head of the Operation Site) Article 5	4
(Appointment of Radiation Protection Supervisors, Etc.) Article 6	4
(Duties of the Supervisor and the Deputy Supervisors) Article 7	4
(Duties of a Proxy for the Supervisor) Article 8	5
(Radiation Safety Committee) Article 9	5
(Manager of RI Research Facilities) Article 10	5
(Radiation Safety Management Office) Article 11	5
(Experiment Managers) Article 12	6
(Radiation Workers) Article 13	6
(Controlled Areas) Article 14	6
(Restrictions on Entry into Controlled Areas) Article 15	7
(Patrols and Inspections) Article 16	7
(Voluntary Inspections) Article 17	7
(Repair and Improvement) Article 18	8
(Approval of Plans to Use Radioisotopes) Article 19	8
(Reception (Purchase, Transfer) of Radioisotopes) Article 20	8
(Transfer of Radioisotopes) Article 21	8
(Use of Radioisotopes) Article 22	9
(Storage of Radioisotopes) Article 23	9
(Transport of Radioisotopes) Article 24	10
(Disposal of Radioisotopes) Article 25	11
(Measurement of Places, Etc.) Article 26	12
(Measurement of Personal Exposure Doses) Article 27	13
(Education and Training) Article 28	14
(Health Examinations) Article 29	15
(Measures Taken for Persons Who were Exposed to Radiation) Article 30	16
(Records and Their Storage) Article 31	16
(Measures to Be Taken If an Abnormality Occurs) Article 32	17
(Handling of Accidents) Article 33	17
(Measures to Be Taken at the Time of a Disaster, Such as an Earthquake) Article 34	17
(Periodic Reporting) Article 35	18
(Reports on Specified Radioisotopes) Article 36	18
(Miscellaneous Rules) Article 37	18
Supplementary Provisions	18
Attached Figure 1: Organizations engaged in preventing radiation hazards	19
Attached Figure 2: Controlled areas	20
Attached Figure 3: Emergency Communication and Reporting System	21
Attached Figure 4: Emergency Facility Inspection, Communication, and Reporting System	21
Attached Table 1: Voluntary Inspection Items	22
Detailed Regulations for Inspection and Maintenance of RI Facilities	23
Attached Figure No. 1	25

(Purpose)

Article 1 The purpose of these Regulations is to stipulate matters related to the handling and management of radioisotopes (hereinafter referred to as “RI”) and other radioactive substances at Tokyo Metropolitan University Minami-Osawa Campus, prevent the occurrence of radiation hazards, and ensure the safety of the general public in accordance with the Act on Prevention of Radiation Disease Due to Radioactive Isotopes, Etc. (Act No. 167 of 1957; hereinafter referred to as the “Act”) and the Ordinance on Prevention of Ionizing Radiation Hazards (hereinafter referred to as the “Ordinance”).

(Scope of Application)

Article 2 These Regulations shall apply to all persons who enter any of the radiation facilities (any facilities that use, store, and dispose of RI, etc.; this applies to the following paragraphs) at Minami-Osawa Campus, as well as all persons who use gas chromatographs with an ECD, X-ray generators, and similar devices.

(Compliance and Other Duties)

Article 3 All persons engaged in radiation work (hereinafter referred to as “Radiation Workers”) and all persons who enter any of the controlled areas temporarily must comply with and follow the instructions given by radiation protection supervisors to prevent radiation hazards.

2. The Head of the Operation Site must give due regard to the reports and recommendations of the Radiation Safety Committee as well as the opinions offered by radiation protection supervisors in accordance with relevant laws and these Regulations, and take the necessary measures to prevent radiation hazards.

(Organizations)

Article 4 The organizations engaged in preventing radiation hazards at Minami-Osawa Campus shall be as listed in Attached Figure 1.

(Head of the Operation Site)

Article 5 The Head of the Operation Site must supervise and manage operations to prevent radiation hazards as stipulated in these Regulations. The Chair of the Faculty of Science (Dean of the Graduate School of Science) shall serve as Head of the Operation Site.

(Appointment of Radiation Protection Supervisors, Etc.)

Article 6 The Head of the Operation Site shall appoint one radiation protection supervisor (hereinafter referred to as the “Supervisor”) and several deputy radiation protection supervisors (hereinafter referred to as the “Deputy Supervisors”) from among holders of a first-class Radiation Protection Supervisor’s license to supervise the overall radiation work in order to prevent the occurrence of radiation hazards.

2. If neither the Supervisor nor any of the Deputy Supervisors is able to perform his or her duties for such reasons as travel or sickness, the Head of the Operation Site shall appoint a proxy for the Supervisor from among holders of a first-class Radiation Protection Supervisor’s license to perform the Supervisor’s duties on his or her behalf.

3. In accordance with the provision of Article 36.2 of the Act, the Head of the Operation Site shall require the Supervisor and the Deputy Supervisors (excluding those who have undergone periodic training within one year of their appointment as such) to undergo periodic training within one year of their appointment as such or within three years of attendance at the previous one.

(Duties of the Supervisor and the Deputy Supervisors)

Article 7 The Supervisor shall supervise the overall radiation work at Minami-Osawa Campus to prevent the

occurrence of radiation hazards. When necessary, the Supervisor shall also:

- (1) Participate in the establishment, revision, and abolition of regulations for prevention of radiation hazards
- (2) Participate in the development of important plans as required by the Act
- (3) Review applications, notifications, and reports in accordance with relevant laws and ordinances
- (4) Be present at on-site inspections, etc.
- (5) Participate in investigations of the causes of abnormality and accidents
- (6) Offer the Head of the Operation Site his or her opinions about ways to prevent radiation hazards
- (7) Audit facilities, account books, documents, etc. to check the use of RI, etc.
- (8) Give advice and instructions and make recommendations to concerned parties
- (9) Request a meeting of the Radiation Safety Committee to be convened
- (10) Address other necessary matters to prevent radiation hazards

2. The Deputy Supervisors shall assist the Supervisor, and if the Supervisor is unable to perform his or her duties for such reasons as travel or sickness, one of the Deputy Supervisors shall perform the Supervisor's duties on his or her behalf.

(Duties of a Proxy for the Supervisor)

Article 8 If neither the Supervisor nor any of the Deputy Supervisors is able to perform his or her duties for such reasons as travel or sickness, the proxy for the Supervisor must perform the Supervisor's duties on his or her behalf.

(Radiation Safety Committee)

Article 9 The Minami-Osawa Campus Radiation Safety Committee (hereinafter referred to as the "Radiation Safety Committee") shall establish safety management systems to prevent radiation hazards in Minami-Osawa Campus and handle RI and other radioactive substances properly. The Committee shall also ensure that such systems are implemented appropriately in the campus.

2. The committee members shall be appointed in accordance with the regulations by the Minami-Osawa Campus Radiation Safety Committee specified separately.

3. The Radiation Safety Committee shall operate in accordance with the separately stipulated Regulations for the Minami-Osawa Campus Radiation Safety Committee.

(Manager of RI Research Facilities)

Article 10 A Manager of RI Research Facilities (hereinafter referred to as the "Facility Manager") shall be assigned to oversee and operate the facilities. The Chair of the Faculty of Science (Dean of the Graduate School of Science) shall serve as Facility Manager.

(Radiation Safety Management Office)

Article 11 A Radiation Safety Management Office (hereinafter referred to as the "Management Office") shall be established to prevent the occurrence of radiation hazards.

2. A manager shall be assigned to the Management Office to supervise radiation management work.

3. The Manager of the Management Office shall be appointed by the Facility Manager.

4. A Management Office Committee shall be established in the Management Office to deliberate on Office work and, as necessary, assist in such work. The Management Office Committee shall comprise several

members appointed by the Facility Manager.

5. The Management Office shall be responsible for the following work:

- (1) Management of the entry of persons into and their exit from a controlled area as well as of exposure to radiation and contamination with radioactive substances
- (2) Measurement and management of dose equivalent rates, surface concentrations of contamination, and other indicators at the radiation facilities and the controlled areas
- (3) Maintenance of measuring instruments for radiation management
- (4) Management of reception, transfer, use, storage, transport, disposal, etc. of RI
- (5) Management of other technical matters related to persons who enter any of the controlled areas and to the safety of radiation work
- (6) Development of education/training plans for Radiation Workers and their implementation
- (7) Development of health examination plans for Radiation Workers and their implementation
- (8) Storage and disposal of waste
- (9) Putting the work specified in (1) to (8) above on record and keeping such records
- (10) Issuing notifications and applications based on relevant laws and ordinances as well as other communications with related government agencies
- (11) Maintenance of radiation facilities and equipment
- (12) Performance of other work needed for radiation safety management

(Experiment Managers)

Article 12 In order to ensure the safe handling of RI and other radioactive substances, the Management Office shall designate an experiment manager for each radiation work.

2. Teachers, who are Radiation Workers, shall serve as experiment managers. Following the instructions of the Supervisor, Radiation Safety Committee, and Management Office, they shall give appropriate instructions on the handling of RI and other radioactive substances and shall be responsible mainly for recording the use, storage, and disposal of RI and other radioactive substances.

(Radiation Workers)

Article 13 Radiation Workers refer to those engaged in radiation work at the University or other operation sites, who are certified as such by the Facility Manager after checking and confirming the results of health examinations and education/training, and other requirements.

2. Radiation Workers must comply with the Regulations for Prevention of Radiation Hazards and the detailed rules for rooms used for radiation work, and follow the instructions given by the Supervisor and the Management Office to prevent radiation hazards.

3. Radiation Workers must be subject to radiation exposure management.

4. If a Radiation Worker violates any of the provisions of Paragraphs 2 and 3, the Facility Manager may cancel his or her certification as Radiation Worker.

(Controlled Areas)

Article 14 In order to prevent radiation hazards, the Head of the Operation Site shall designate places where there is a risk of radiation hazards as controlled areas through deliberations by the Radiation Safety Committee.

2. In principle, the designation of controlled areas as stipulated in the preceding paragraph shall be based on

the standards established in the Act and the Ordinance.

3. The controlled areas shall be as shown in Attached Figure 2.

(Restrictions on Entry into Controlled Areas)

Article 15 Persons who enter any of the controlled areas must abide by the rules listed in the following.

- (1) Enter and leave a controlled area through the designated entrances and exits.
- (2) Wear a radiation survey meter at the designated part of their bodies to measure exposure to radiation.
- (3) Refrain from eating, drinking, smoking, applying makeup, etc.
- (4) Follow the precautions established for each facility.
- (5) Wear designated clothes and footwear when entering an unsealed facility where RI are used.
- (6) Bring goods out of an unsealed facility where RI are used after confirming that their surfaces are not contaminated with radiation.
- (7) Leave an unsealed facility where RI are used after confirming that their bodies, clothes, and other personal belongings are not contaminated with radiation. If a contaminated item is detected and its decontamination cannot be accomplished easily, they shall inform the Management Office immediately and follow its instructions.
- (8) If they have or may have ingested RI into their bodies accidentally, they shall inform the Management Office immediately and follow its instructions.

2. Persons who enter a controlled area temporarily must notify the Manager of the Management Office and obtain an entry permit, and when they enter it, they must always be accompanied by a Radiation Worker. While inside the controlled area, they must follow the instructions of the Supervisor and the Radiation Worker to prevent radiation hazards and ensure the safety of the facility visited.

(Patrols and Inspections)

Article 16 The Manager of the Management Office must patrol and inspect the radiation facilities periodically in accordance with the Detailed Regulations for Inspection and Maintenance of RI Facilities, which are separately laid down.

2. If the Manager of the Management Office finds an abnormality as a result of patrols and inspections as stipulated in the preceding paragraph, he or she must report it to the Facility Manager and the Radiation Safety Committee through the Supervisor and take the necessary measures.

3. The Manager of the Management Office must put the results of inspections on record and keep such records. Such records must include the following information:

- (1) Name of the inspector
- (2) Date and time of inspection
- (3) Locations inspected
- (4) Inspection methods used
- (5) Results of inspections and the measures taken

(Voluntary Inspections)

Article 17 In accordance with the Detailed Regulations for Inspection and Maintenance of RI Facilities, the Manager of the Management Office must periodically perform voluntary inspections of the radiation facilities in line with the items listed in Attached Table 1.

2. If the Manager of the Management Office finds an abnormality as a result of voluntary inspections as stipulated in the preceding paragraph, he or she must investigate its circumstances and causes, take the

necessary measures, and report the results of the measures taken to the Supervisor.

3. The Manager of the Management Office must report the results of voluntary inspections to the Facility Manager and the Head of the Operation Site through the Supervisor.

4. The Manager of the Management Office must put the results of inspections on record and keep such records. Such records must include the following information:

- (1) Name of the inspector
- (2) Date and time of inspection
- (3) Locations inspected
- (4) Inspection methods used
- (5) Types and models of measuring instruments
- (6) Results of inspections and the measures taken

(Repair and Improvement)

Article 18 If the Facility Manager plans to repair or improve any radiation facilities or equipment, he or she must draw up implementation plans for such repair and improvement and seek approval from the Supervisor and the Head of the Operation Site. This shall not apply, however, if such repair and improvement have only minor effects on the facilities and equipment from the viewpoint of safety.

2. When giving approval as stipulated in the preceding paragraph, the Head of the Operation Site shall consult with the Radiation Safety Committee about the safety of the repair and improvement plan, the safety measures that should be taken, and so forth if he or she deems it necessary to do so.

3. After repair, improvement, and other plans as stipulated in Paragraph 1 are completed, the Facility Manager must report the results to the Head of the Operation Site through the Supervisor.

(Approval of Plans to Use Radioisotopes)

Article 19 If experiment managers intend to use RI and other radioactive substances, they must draw up an experiment plan in advance every time they conduct an experiment and obtain approval from the Supervisor through the Manager of the Management Office.

(Reception (Purchase, Transfer) of Radioisotopes)

Article 20 If experiment managers wish to receive (purchase or obtain by transfer) RI, they must obtain prior approval for plans to use these substances as stipulated in the preceding article.

2. If experiment managers plan to receive (purchase or obtain by transfer) RI, they must file an application with the Management Office to receive (purchase or obtain by transfer) RI and obtain permission therefrom, in addition to the procedures stipulated in the preceding article.

3. RI shall be received (purchased or obtained by transfer) through the Management Office.

4. The Management Office shall enter details of reception, such as the date of reception; the name of delivery person; the purpose, method, and location of reception; the types, amounts, and chemical forms of RI; and the names of persons engaged in reception, in the RI reception/transfer/storage/disposal ledger, and store the RI received (purchased or obtained by transfer) in designated storage facilities.

(Transfer of Radioisotopes)

Article 21 Persons who wish to transfer RI must complete an application for transferring RI and the prescribed

documents to transfer RI, and submit them to the Management Office to obtain the Supervisor's permission.

2. The Management Office shall be in charge of transferring RI.
3. The Management Office shall enter details of transfer, such as the date of transfer; the name of the recipient; the purpose, method, and location of transfer; the types, amounts, and chemical forms of RI; and the names of persons engaged in transfer, in the RI reception/transfer/storage/disposal ledger.

(Use of Radioisotopes)

Article 22 After experiment managers obtain approval for their experiment plans, they must file an application with the Management Office and follow the prescribed procedures when they plan to use RI.

2. When using RI, Radiation Workers must follow the rules listed below.

(1) If they use unsealed RI

- a. They must strictly follow all the precautions for the facilities used when working in fume hoods, at laboratory tables, and with other pieces of equipment allocated by the Management Office in the facilities.
- b. They must not exceed the amount of RI permitted for use.
- c. They must take the necessary measures to reduce radiation exposure and prevent their bodies and clothes from being contaminated with radiation during the work. They must also work while using a survey meter to confirm whether their bodies and clothes are contaminated with radiation.
- d. In principle, they must not work alone.
- e. They must work in the fume hood and, as necessary, set traps if there is a risk of gas being generated.
- f. They must handle animals to which RI are administered only in a breeding hood and must not relocate them to other rooms, such as darkrooms, while they are still alive.
- g. Liquid waste, including secondary cleansing water, must be stored before disposal and not be discarded directly into the sink.
- h. Solid waste must be separated into inflammables, flame-retardant items, nonflammables, and animals, and liquid waste, into inorganic liquid wastes, organic liquid waste, and slurry, before being discarded into the prescribed containers.
- i. After completing the experiments, they must submit to the Management Office a notice of completion that all necessary measures have been taken.

(2) If they use sealed RI

- a. They must record necessary matters for each piece of work.
- b. They must strictly follow all the precautions for the facilities used.
- c. During the work, they must strive to reduce radiation exposure mainly by measuring ambient dose equivalent rates while using RI.
- d. In principle, they must not work alone.
- e. They must confirm safety without fail when entering an irradiation chamber.
- f. They must complete their work in an irradiation chamber within the predetermined time frame.
- g. During irradiation, they must indicate at the entrance of the irradiation chamber that irradiation is ongoing.

(3) If they use an X-ray generator or similar devices

- a. If these devices are equipped with a fail-safe mechanism, they must confirm before use that such a mechanism is functioning properly.
- b. While these devices are in use, they must clearly indicate that they are in operation.

(Storage of Radioisotopes)

Article 23 The Management Office shall be responsible for the storage of RI in accordance with the following

rules:

- (1) RI shall be stored in Storage Room I if their use is allowed in Training Room for Physics Students, that for Chemistry Students, that for Biology Students (including Breeding Sign Room and Darkroom I), High-level Laboratory I, Measurement Room I, Inorganic Chemistry Laboratories I and II, and Physics/Chemistry Laboratory.
 - (2) RI shall be stored in Storage Room II if their use is allowed in Biology Laboratory (including High-level Laboratory II, P2 Laboratory, Low-temperature Laboratory, Aseptic Room, Darkrooms II and III, Cleaning Room, Equipment Room, and Measurement Room II).
2. Persons who bring RI into or out of the Storage Room must file an application with the Management Office and follow the prescribed procedures.
 3. RI must be stored in the prescribed Storage Room each day after the day's work is completed. If the work is performed continuously, however, the RI that are being used may be kept in the room used with the approval of the Manager of the Management Office. In this case, its users must take adequate measures to prevent radiation hazards and put up signs specifying the types and amounts of RI and other necessary matters.
 4. The doors of the Storage Rooms must be locked at all times unless the rooms are used.
 5. When RI are stored, necessary matters, such as the types, amounts, and chemical forms, must be entered in the storage record book.
 6. The Manager of the Management Office must periodically confirm the amounts of RI stored and the condition of their storage.

(Transport of Radioisotopes)

Article 24 Persons who transport RI and other radioactive substances must obtain approval from the Manager of the Management Office and observe the rules set forth in the following items:

- (1) Transport within the controlled areas
 - They must take the necessary measures, for example, to prevent RI containers from toppling over or tumbling down and preclude the spread of contamination, thereby ensuring safety.
- (2) Transport within the Operation Site
 - a. They must take measures so that there is no risk of cracking, breaking down, or damage of the transport equipment containing RI, due to changes in temperature and internal pressure, vibration, and other phenomena that may occur during the transport.
 - b. They must take measures so that the concentration of RI on the surfaces of goods being transported does not exceed 1/10 of its upper limit.
 - c. They must take measures so that the dose equivalent rate on the surfaces of goods being transported does not exceed 2 mSv/h and that the dose equivalent rate at a location one meter from the surfaces of goods being transported does not exceed 100 μ Sv/h.
 - d. They must clearly indicate the nuclides and their amounts on the containers and affix the prescribed signs to the containers.
 - e. They must work in groups of two persons or more.
 - f. They must notify the Manager of the Management Office of the details of their work (date and time, routes of transport, workers' names, and nuclides and their amounts). They must report the completion of work to the Manager of the Management Office.
- (3) Transport outside the Operation Site
 - a. They must obtain permission from the Supervisor and follow the Supervisor's instructions.
 - b. They must take measures that meet the standards established by relevant laws and ordinances in

order to ensure safety of transport.

- c. They must record the date of transport and other details, the transport method, the names of receivers or senders, and those of persons engaged in transport or entities to which transport is entrusted.

2. The Manager of the Management Office must enter necessary information in the transport record book and be in charge of safekeeping of the book.

(Disposal of Radioisotopes)

Article 25 When it is disposed of, solid RI waste must be separated into inflammables, flame-retardant items, nonflammables, and animals, and liquid RI waste, into such categories as inorganic liquid waste, organic liquid waste, and slurry. These categories of waste must be entered in the waste records available in the rooms where they are used and the waste discarded into their respective containers in accordance with the Management Office's instructions.

2. Solid waste and inorganic liquid waste must be stored in the storage/disposal facilities temporarily and then turned over to the Japan Radioisotope Association in accordance with the Management Office's instructions.
3. Organic liquid waste must be stored and disposed of at organic waste liquid storage/disposal facilities.
4. Solid and liquid RI wastes that emit α -rays must be sealed in prescribed containers and stored in storage/disposal facilities.
5. When wastewater is discharged from drainage facilities, its RI concentration must be measured to confirm that it does not exceed the maximum permissible concentration.
6. Gassy radioactive waste must be discharged through an air exhauster after its RI concentration at the exhaust port is reduced to a value lower than the maximum permissible concentration.
7. Liquid scintillator waste must be incinerated in an incinerator in accordance with the rules set forth in the following items:
 - (1) Only liquid scintillator waste that contains only ^3H , ^{14}C , ^{32}P , ^{35}S , and ^{45}Ca , and combustion improvers can be disposed of by incineration.
 - (2) The concentrations of liquid scintillator waste must not exceed the upper limits listed below. Measures must be taken so that the RI concentration of exhaust gas at the exhaust port and that of wastewater at the drainage port do not exceed the statutory maximum permissible concentration.
 - a. ^3H , ^{14}C , and ^{35}S : 37 Bq/cm^3
 - b. ^{32}P and ^{45}Ca : 3.7 Bq/cm^3If there are several nuclides contained in such liquid waste, the sum of the percentages of nuclide RI concentrations relative to each maximum permissible concentration above must not exceed 100.
 - (3) An Incinerator Safety Management Committee shall be established in the Management Office to discuss incinerator safety management.

The Incinerator Safety Management Committee shall consist of several members of the Management Office Committee and be chaired by the Manager of the Management Office. The chairperson shall supervise the safety of the incinerator and manage the operators and inspectors of the incinerator as well as persons engaged in disposal.
 - (4) The Facility Manager shall provide education/training to the operators and the maintenance and inspection staff of the incinerator, as well as persons engaged in disposal. The Facility Manager shall also provide the staff education/training in safe incinerator operation methods, how to handle liquid

- scintillator waste, and measures to be taken in case of an emergency or when an abnormality is detected.
- (5) The Facility Manager shall designate the operators and the maintenance and inspection staff of the incinerator, as well as persons engaged in disposal from among those who have undergone education/training in safe incinerator operation, maintenance and inspection, and disposal, as well as measures to be taken when an abnormality or danger is detected, and shall have them perform their duties.
 - (6) The incinerator must be operated in accordance with the separately stipulated procedures for liquid scintillator waste incinerator operation, and if an abnormality occurs, its operation must be stopped immediately, the abnormality reported to the Manager of the Management Office and the Supervisor, and appropriate measures taken accordingly.
 - (7) If the incinerator is not used for one year or more, it can be used again only after appropriate measures, such as inspection and repair by its manufacturer, are taken.
 - (8) The incinerator must be inspected periodically in accordance with the separately stipulated procedures for liquid scintillator waste incinerator maintenance and inspection. It must undergo the prescribed inspections before it starts operation, and if an abnormality is detected, appropriate measures must be taken accordingly.
 - (9) Liquid scintillator waste must be handled in accordance with the separately stipulated procedures for the safe handling of liquid scintillator waste.
 - (10) After liquid scintillator waste is disposed of using the incinerator, the items listed below must be recorded, and such records must be kept for five years.
 - a. Date and time of disposal
 - b. Names of persons engaged in disposal
 - c. Type and model of incinerator
 - d. Type of combustion improver
 - e. Components, properties, RI concentration, and volume of liquid scintillator waste
 - f. Results of confirmation, based on actual measurements, of the fact that liquid scintillator waste has been incinerated at the temperature of 800 °C or higher
 - g. Residue disposal methods and the amount of residue
 - (11) Measures taken in case of an emergency or when an abnormality occurs
 - a. If an abnormality is detected, the operation of the incinerator must be stopped immediately to clarify the cause of the abnormality. If the cause of the abnormality is not clear, the incinerator must not be operated until it undergoes technical guidance and inspection by its manufacturer and its operation returns to normal.
 - b. When the operation of the incinerator is resumed, sufficient air purge must be performed before ignition.

8. Sealed RI must be disposed of by turning it over to the Japan Radioisotope Association.

(Measurement of Places, Etc.)

Article 26 The Manager of the Management Office must measure the radiation level and the status of RI contamination at places where there is a risk of radiation hazards and keep a record of measurement results.

2. When the radiation level is measured, the one-centimeter dose equivalent rate or the one-centimeter dose equivalent must be measured using a radiation meter. (At places where the 70-micrometer dose equivalent rate may exceed the one-centimeter dose equivalent rate by tenfold or the 70-micrometer dose equivalent may exceed the one-centimeter dose equivalent by tenfold, the 70-micrometer dose equivalent rate or the 70-micrometer dose equivalent shall be measured.)

3. The radiation level and the status of RI contamination at facilities handling unsealed RI shall be measured

once before the handling of such RI begins and at an interval of less than one month after the handling begins.

4. The radiation level at facilities handling equipment with sealed RI shall be measured once before the handling of such equipment begins and at an interval of six months or less after the handling begins. If such equipment is moved and then used, or if the shield for such equipment or the method of handling it varies, the measurement of the radiation level after the handling begins shall be made at an interval of less than one month.
5. The radiation level for an ECD fitted on a gas chromatograph shall be measured on the surface of the equipment once before the handling of the detector begins and at an interval of six months or less after the handling begins.
6. Notwithstanding the provision of the preceding paragraph, the radiation level for an ECD fitted on a gas chromatograph shall be measured every time a new ECD replaces the old one.
7. With respect to the items listed below, the results of measurement shall be recorded and such records shall be stored for five years.
 - (1) Date and time of measurement
 - (2) Place of measurement
 - (3) Name of person in charge of measurement
 - (4) Type and model of radiation meter
 - (5) Method of measurement
 - (6) Results of measurement

(Measurement of Personal Exposure Doses)

Article 27 The Manager of the Management Office shall require persons who enter any of the controlled areas to wear an appropriate radiation meter in order to measure their personal exposure dose according to the procedures set forth in the following items:

- (1) The measurement of radiation levels refers to that of dose equivalents due to external exposure.
- (2) For the chest (the abdomen for women ^{note 1}), the one-centimeter dose equivalent and the 70-micrometer dose equivalent (one-centimeter dose equivalent for neutron beams) shall be measured.
- (3) In addition to the preceding item, if, among the part of the body that consists of the head and the neck, that which comprises the chest and the upper arm, and that which is made up of the abdomen and the thigh, the part of the body that may experience the largest external radiation exposure is one other than that which consists of the chest and the upper arm (the abdomen and the thigh for women ^{note 1}), the dose equivalents for that part of the body shall also be measured.
- (4) In addition to Items (2) and (3), if the part of the body that may experience the largest external radiation exposure is one other than the head, neck, chest, upper arm, abdomen, and thigh, the 70-micrometer dose equivalent for that part of the body shall be measured. This shall not apply to neutron beams, however.
- (5) If a person has or may have ingested RI by mistake, measurements shall also be made with respect to internal radiation exposure.
- (6) The dose equivalent for persons who enter any of the controlled areas shall be measured continuously when they remain in the area. That for persons considered by the Manager of the Management Office as entering a controlled area temporarily shall be measured if the effective dose for external radiation exposure may exceed 100 μ Sv.
- (7) With respect to the items listed below, the results of measurement shall be recorded.

- a. Names of persons measured
 - b. Name of person in charge of measurement
 - c. Type and model of radiation meter
 - d. Method of measurement
 - e. Parts of body measured and results of measurement
- (8) The count from the results of measurement stipulated in the preceding paragraph shall be taken and recorded for each three-month period that starts from April 1, July 1, October 1, and January 1 and for a one-year period that starts from April 1 (as well as for each one-month period that starts from the first day of each month for women^{note 2}).
- (9) Based on the results of measurement stipulated in Item (7), effective doses and equivalent doses shall be calculated and recorded for the items listed below. In calculating equivalent doses, the dose equivalent shall be as follows: 70-microcentimeter dose equivalent for the skin; one-centimeter dose equivalent or 70-microcentimeter dose equivalent for the crystalline lens, whichever is appropriate; and one-centimeter dose equivalent for the surface of a pregnant woman's abdomen.
- a. Date of calculation
 - b. Names of persons measured
 - c. Name of person in charge of calculation
 - d. Effective dose
 - e. Equivalent dose
- (10) Effective doses and equivalent doses shall be calculated and recorded for each three-month period that starts from April 1, July 1, October 1, and January 1 and for a one-year period that starts from April 1 (as well as for each one-month period that starts from the first day of each month for women^{note 2}).
- (11) If, as a result of effective-dose calculations, the effective dose for a one-year period that starts from April 1 exceeds 20 mSv, the cumulative effective dose shall be calculated each year after the period ends for the five years that include this one-year period, and a record shall be kept with respect to the following items:
- a. Date of data collection
 - b. Names of persons measured
 - c. Name of data collector
 - d. Period of data collection
 - e. Cumulative effective dose
- (12) Records as specified in Items (7) to (11) must be kept permanently and their copies delivered to the persons measured every time they are kept.
- Note 1) Excluding those who are diagnosed as disabled and those who notify the Head of the Operation Site in writing that they do not intend to become pregnant
- Note 2) Women who make it known to the Head of the Operation site, mainly by notifying him or her personally that they are pregnant

2. Based on the results of measurement stipulated in the preceding paragraph, the Manager of the Management Office must prepare a map showing the number of Radiation Workers at the radiation facilities during a one-year period and the distribution of their personal effective doses.

(Education and Training)

Article 28 The Manager of the Management Office must make these Regulations known to Radiation Workers and other parties concerned and provide the necessary education and training to prevent the occurrence of radiation hazards.

2. Education and training as stipulated in the preceding paragraph shall be provided according to the provisions

of the items listed below.

- (1) Education and training shall be provided:
 - a. before Radiation Workers are certified as such for the first time, and
 - b. at an interval of one year or less for Radiation Workers who continue to be certified as such.
- (2) The education/training items and the number of education/training hours for Case (a) above and the education/training items for Case (b) above shall be as specified below.
 - a. Effects of radiation on the human body: 30 minutes or more
 - b. How to handle RI and similar substances and radiation generators: Four hours or more
 - c. Laws and ordinances to prevent radiation hazards: One hour or more
 - d. Regulations for Prevention of Radiation Hazards: 30 minutes or more
 - e. Other necessary matters related to the prevention of radiation hazards: As necessary
3. If Radiation Workers complete all the required classes in Radiation Experimental Methods (I), which is a subject required for all students in the Faculty of Science and includes the contents of education and training stipulated in the preceding paragraph, and earn the required number of credits, they shall be considered to have undergone the education and training stipulated in the preceding paragraph.
4. Notwithstanding the provisions of Paragraph 2, Radiation Workers who are considered to have sufficient knowledge and skills with respect to the education/training items listed in Paragraph 2 (2) shall be exempted from undergoing all or part of the education and training.
5. If Radiation Workers are exempted from undergoing all or part of the education and training in accordance with the provisions of the preceding paragraph, their names, the education/training exemption period, and the reason for exemption must be put on record.
6. The Manager of the Management Office shall record all education/training plans and the results of their implementation.
7. In order to prevent the occurrence of radiation hazards, the Manager of the Management Office must make all necessary precautions known to those who enter any of the controlled areas temporarily.

(Health Examinations)

Article 29 The Manager of the Management Office shall ensure that all Radiation Workers undergo health examinations according to the provisions of the following items:

- (1) Health examinations shall be conducted:
 - a. before Radiation Workers enter a controlled area for the first time in their capacity, and
 - b. at an interval of one year or less after Radiation Workers enter a controlled area.
- (2) Health examinations shall be conducted by interview or examination. The interview shall involve asking questions about the history and condition of radiation exposure, and the examination shall cover the following parts of the body and items:
 - a. Hemoglobin level or hematocrit value, red blood cell and white blood cell counts, and differential white blood cell count in peripheral blood
 - b. Skin
 - c. Eyes

However, the parts of the body and items listed in Items (a) to (c) above (Items (a) and (b) shall be excluded in the health examination conducted before Radiation Workers enter a controlled area for the first time) shall be examined only if deemed necessary by a physician.

2. Notwithstanding the provisions of the preceding items, the Manager of the Management Office must ensure that Radiation Workers undergo health examinations without delay if they fall into one of the categories set forth in the following items:

- (1) Those who swallowed or inhaled RI accidentally
- (2) Those whose skin was contaminated with RI in excess of the maximum permissible surface concentration of contamination and who could not remove it easily
- (3) Those whose skin wounds were or might have been contaminated with RI
- (4) Those who was or might have been exposed to radiation in excess of the upper limit of the effective dose equivalent or equivalent dose

3. The Manager of the Management Office must record the results of health examinations according to the following items:

- (1) Dates of health examinations
- (2) Names of persons who underwent health examinations
- (3) Name of physician who conducted health examinations
- (4) Results of health examinations
- (5) Measures taken based on the results of health examinations

4. The Manager of the Management Office must record the results of health examinations, keep such records permanently, and deliver copies of the records of health examination each time to those who have undergone health examinations. The results of health examinations for school personnel, however, shall be kept permanently by the departments to which they belong.

(Measures Taken for Persons Who were Exposed to Radiation)

Article 30 The Manager of the Management Office must consult with the Supervisor and the Facility Manager about persons who have or may have been exposed to radiation and report to the Head of the Operation Site measures that need to be taken from the viewpoint of health care.

2. If such measures are reported as stipulated in the preceding paragraph, the Head of the Operation Site must take appropriate measures.

(Records and Their Storage)

Article 31 The Management Office shall make books available to put the items listed below on record and keep such records properly.

- (1) Records of reception, transfer, use, storage, and disposal of RI
- (2) Records of entry into and exit from the facilities used
- (3) Records of measurement of places
- (4) Records of radiation exposure measurement
- (5) Records of health examinations
- (6) Records of transport
- (7) Records of education/training
- (8) Records of Radiation Workers
- (9) Records of facility patrols and inspections
- (10) Records of voluntary facility inspections
- (11) Documents submitted to related government agencies

2. The Management Office shall open record books for Items (1) to (10) of the preceding paragraph on April 1 of each year and close them on March 31 of the following year. The record books must be kept for five years after they are closed. The record books for Items (4) and (5) of the preceding paragraph shall be kept

permanently, however. If the Operation Site is abolished, the record books shall be closed on the day of its abolition.

(Measures to Be Taken If an Abnormality Occurs)

Article 32 If an abnormality, such as radiation exposure, contamination, leakage, and equipment trouble, occurs or may occur when RI are handled, the necessary measures must be taken in accordance with the provisions of the following items:

- (1) Those who detect such an abnormality must take emergency measures immediately and report it to the Manager of the Management Office, the Supervisor, and the Facility Manager.
- (2) Those who receive such a report must take the necessary measures and immediately inform all parties concerned accordingly.
- (3) If one of the events listed below occurs, the Head of the Operation Site must report to the Nuclear Regulation Authority about the occurrence of the event immediately, its status, and measures taken to cope with it within ten days of the occurrence.
 - a. If an abnormal leak of RI or similar substances occurs
 - b. If Radiation Workers are exposed to radiation and their radiation exposure dose exceeds or may exceed the upper limit of the effective dose or equivalent dose
 - c. If radiation hazard other than the cases listed in Items (a) and (b) occurs or may occur

(Handling of Accidents)

Article 33 If an accident, such as stolen or missing RI, occurs, the necessary measures must be taken according to the provisions of the following items:

- (1) Those who discover such an accident must report it to the Manager of the Management Office, the Supervisor, and the Facility Manager immediately.
- (2) Those who receive such a report must forward it to the Head of the Operation Site immediately.
- (3) The Head of the Operation Site must report the accident to the competent police station and the Nuclear Regulation Authority immediately and report the status of the accident and the measures taken to cope with it to the Nuclear Regulation Authority within ten days of the occurrence.

(Measures to Be Taken at the Time of a Disaster, Such as an Earthquake)

Article 34 If a radiation hazard occurs or may occur in the event of a disaster, such as an earthquake or a fire (hereinafter referred to as "Earthquakes, Etc."), the necessary measures must be taken according to the provisions of the following items:

- (1) Those who discover a dangerous situation must immediately inform the Manager of the Management Office, the Supervisor, and the Facility Manager of the situation according to the emergency communication and reporting system shown in Attached Figure 3.
 - (2) Those who receive such a report must forward it to the Head of the Operation Site immediately and take the necessary measures to prevent radiation hazards.
 - (3) The Head of the Operation Site must immediately report the dangerous situation to the competent police and fire stations as necessary and notify the Nuclear Regulation Authority of the necessary matters, such as the extent of a radiation hazard that is or may be incurred due to Earthquakes, Etc., without delay.
2. If a disaster, such as an earthquake or a fire, occurs, the persons designated in advance must conduct inspections with respect to inspection items stipulated in Article 16 according to the emergency facility inspection, communication, and reporting system prescribed in Attached Figure 4, and must report the results of inspections to the Head of the Operation Site through the Supervisor.
 3. Several persons shall be appointed as such by the Facility Manager following the recommendations made by

the Management Office Committee.

(Periodic Reporting)

Article 35 The Manager of the Management Office must compile a report on the status of radiation management for the period from April 1 of each year to March 31 of the following year and submit it to the Facility Manager and the Head of the Operation Site through the Supervisor.

2. The Head of the Operation Site must submit the report to the Nuclear Regulation Authority within three months of the passage of the period reported.

(Reports on Specified Radioisotopes)

Article 36 The Manager of the Management Office must compile a report on the specified RI listed below and submit it to the Nuclear Regulation Authority.

- (1) If specified RI are manufactured, imported, received, carried out, or disposed of, such manufacture, import, reception, transfer, or disposal must be reported within 15 days of the event.
- (2) If a change is made to the already reported contents of specified RI (including cases in which they cease to be RI due to changes), such a change must be reported within 15 days of the event.
- (3) A report on specified RI possessed at the end of a given year must be submitted by June 30 of the following year.

(Miscellaneous Rules)

Article 37 Matters required for the enforcement of these Regulations shall be decided by the Head of the Operation Site through discussions held in the Radiation Safety Committee.

Supplementary Provision

These Regulations shall take effect on April 1, 2005

Supplementary Provision

These Regulations shall take effect on May 1, 2006.

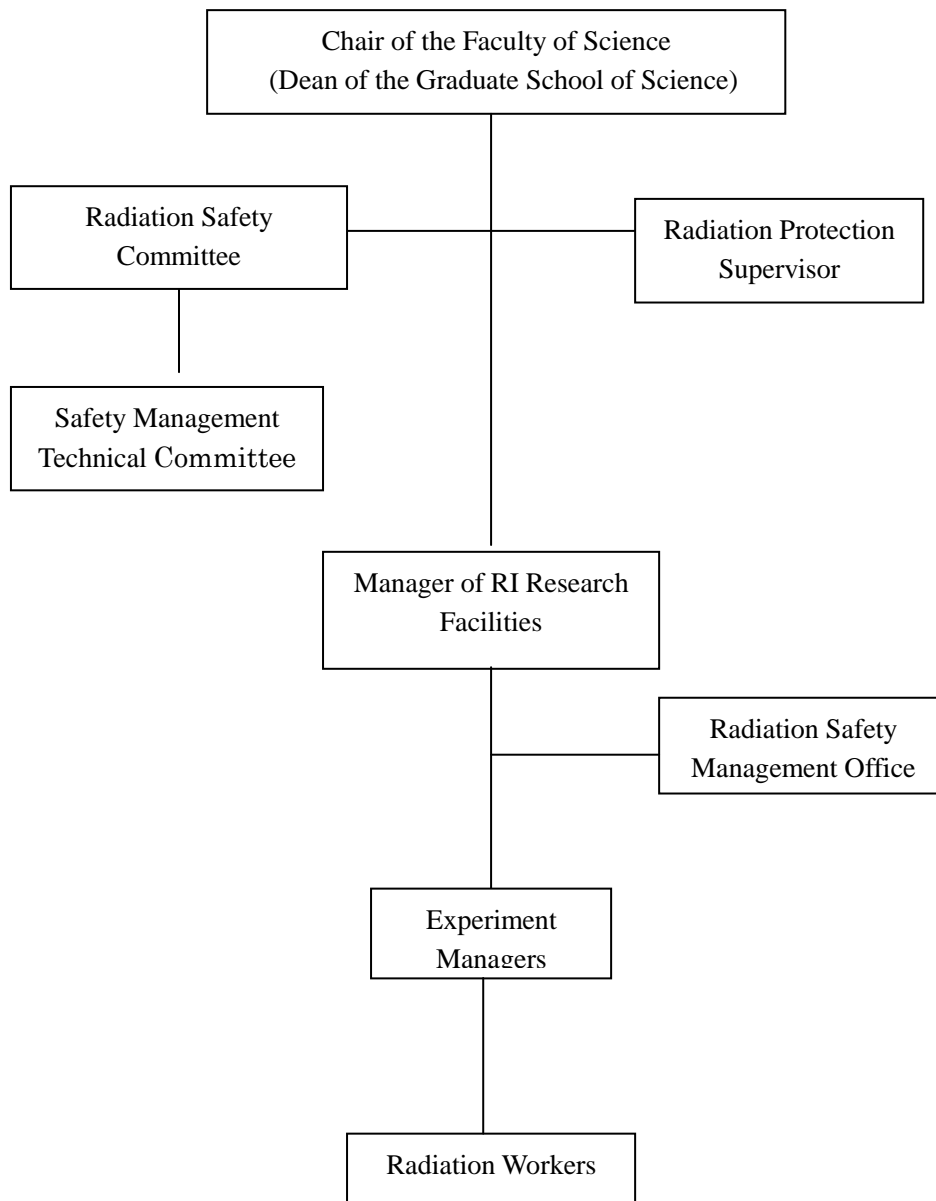
Supplementary Provision

These Regulations shall take effect on August 1, 2010.

Supplementary Provision

These Regulations shall take effect on April 1, 2018.

Attached Figure 1: Organizations engaged in preventing radiation hazards



Non-controlled Area



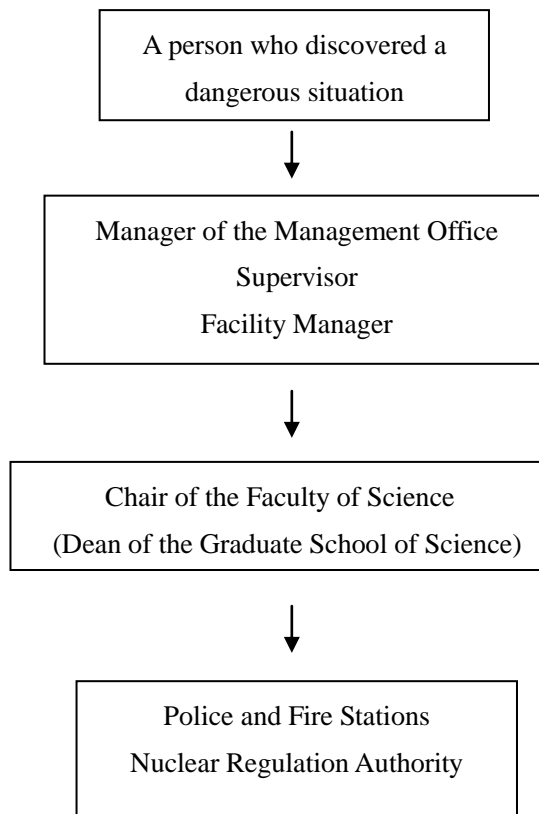
RI Building 1st Floor Plan

Attached Figure: Controlled Areas

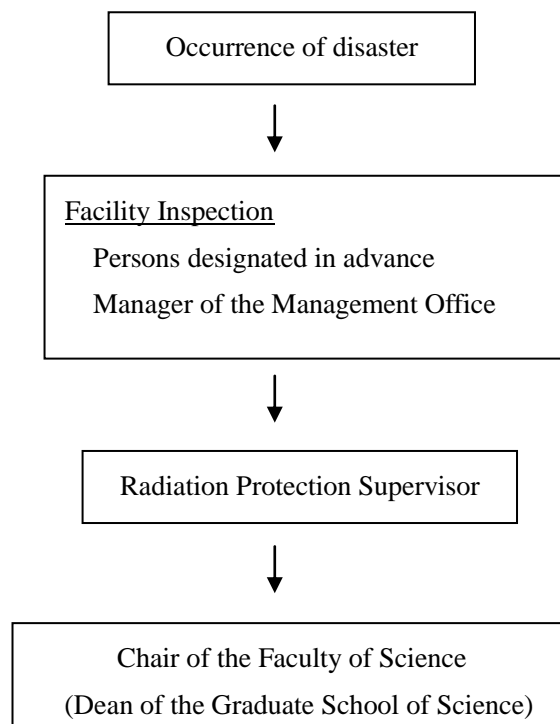


RI Building 2nd Floor Plan

Attached Figure 3: Emergency Communication and Reporting System



Attached Figure 4: Emergency Facility Inspection, Communication, and Reporting System



Attached Table 1: Voluntary Inspection Items

(Inspections must be conducted by the Manager of the Management Office twice a year or more.)

Classification	Inspection item
Location of facilities, etc.	(1) Location (2) Risk of a landslide (3) Risk of inundation (4) Situation around the facilities
Main structure, etc.	(1) Structure and materials
Controlled area	(1) Demarcation and closed equipment (2) Structure of flooring, walls, etc. and surface finish (3) Dose equivalent (4) Signs
Workroom	(1) Structure of flooring, walls, etc. and surface finish (2) Flow of air in the room (3) Fume hoods, glove boxes, etc. (4) Signs
Contamination inspection room	(1) Location of installation, etc. (2) Structure of flooring, walls, etc. and surface finish (3) Cleaning equipment (4) Dressing equipment (5) Decontamination equipment and materials (6) Radiation meters (7) Signs
Storage room	(1) Location of installation, etc. (2) Structure and materials (3) Condition of shielding (4) Dose equivalent (5) Amount of radioisotopes stored (6) Closing equipment (7) Signs
Irradiation chamber	(1) Location of installation, etc. (2) Structure of flooring, walls, etc. (3) Closing equipment (4) Condition of shielding (5) Dose equivalent (6) Safety systems (7) Radiation meters (8) Signs

Classification	Inspection item
Beam laboratory	(1) Location of installation, etc. (2) Structure of flooring, walls, etc. (3) Closing equipment (4) Condition of shielding (5) Dose equivalent (6) Signs
Room where gas chromatographs with an ECD are used	(1) Location of installation, etc. (2) Closing equipment (3) Condition of devices (4) Signs
Storage/disposal room	(1) Location of installation, etc. (2) Structure of flooring, walls, etc. (3) Closing equipment (4) Storage/disposal containers (5) Storage situation (6) Signs
Incinerator	(1) Location of installation, etc. (2) Structure and materials (3) Condition of devices (4) Safety systems (5) Signs
Air exhauster	(1) Location of installation, etc. (2) Structure of flooring, walls, etc. and surface finish (3) Exhaust purification system (4) Exhaust fan (5) Exhaust duct, exhaust port (6) Contaminated air flow prevention device (7) Signs
Drainage facilities	(1) Location of installation, etc. (2) Structure of flooring, walls, etc. and surface finish (3) Wastewater purification system (4) Drainage pipe (5) Signs

Detailed Regulations for Inspection and Maintenance of RI Facilities

(Purpose)

Article 1 The purpose of these Detailed Regulations is to establish standards for activities, such as voluntary inspections of radiation facilities and rooms where gas chromatographs with an ECD are used (hereinafter referred to as “Facilities”), in accordance with the Tokyo Metropolitan University Minami-Osawa Campus Regulations for Prevention of Radiation Hazards (hereinafter referred to as the “Preventive Regulations”) and apply them when such activities are carried out.

(Organization)

Article 2 The organization for inspection and maintenance of RI and similar substances at the Facilities shall be as shown in Attached Figure No. 1.

(Patrols and Inspections)

Article 3 The Manager of the Management Office must patrol and inspect the Facilities periodically according to the items listed in Attached Table 1.

2. If the Manager of the Management Office finds an abnormality as a result of patrols and inspections as stipulated in the preceding paragraph, he or she must report such an abnormality to the Facility Manager and the Radiation Safety Committee through the Supervisor and take the necessary measures.

(Voluntary Inspections)

Article 4 The Manager of the Management Office must periodically conduct voluntary inspections of the Facilities according to the inspection items listed in Attached Table 2 and with the frequency stipulated for each item.

2. If the Manager of the Management Office finds an abnormality as a result of patrols and inspections as stipulated in the preceding paragraph, he or she must investigate its situation and causes, take the necessary measures, and inform the Supervisor of the results of investigations and those of the measures taken.
3. After completing voluntary inspections, the Manager of the Management Office must report the results of inspections to the Facility Manager and the Head of the Operation Site through the Supervisor.

(Records and Storage)

Article 5 The Manager of the Management Office must keep records as stipulated in Articles 3 and 4 for five years.

2. Records as stipulated in the preceding paragraph shall include the following matters:

- (1) Name of the inspector
- (2) Date and time of inspection
- (3) Inspection spots
- (4) Inspection methods
- (5) Types and models of measuring instruments
- (6) Results of inspections and measures taken

(Periodic Reporting)

Article 6 The Manager of the Management Office must compile a voluntary inspection report for the period from April 1 of each year to March 31 of the following year and submit it to the Head of the Operation Site

through the Supervisor.

(Supplementary Rules)

Article 7 Matters required for the enforcement of these Detailed Regulations shall be decided by the Facility Manager through discussions held in the Management Office Committee.

Supplementary Provision

These Detailed Regulations shall take effect on April 1, 2005.

Supplementary Provision

These Detailed Regulations shall take effect on May 1, 2006.

Supplementary Provision

These Detailed Regulations shall take effect on April 1, 2018.

Attached Figure No. 1

