Regulations on Safety Management of Radiation

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Chapter 1 General Provisions

Article 1 (Purpose) The purpose of these Safety Management Regulations of Pohang University of Science and Technology(hereinafter referred to as “Regulations”), pursuant to Article 53, Clause 3 of the Nuclear Safety Act and Article 67 of its Enforcement Rules (hereinafter referred to as “Rules”), is to set forth various standards necessary for the use, storage, transport, disposal, and other handling of radioactive isotopes and radiation-generating devices to prevent in advance various hazards to human, property, and the public.

Article 2 (Application Scope) These regulations shall apply to personnel of Pohang University of Science and Technology and its affiliated Pohang Accelerator Laboratory (hereinafter referred to as “University”) who engage in radiation-related work, access the radiation area frequently, and engage in other related works.

Article 3 (Definition of Terms) The terms used in these regulations shall be defined as follows:

1. “Radioactive isotope” refers to isotopes and their compounds generating radiation as specified by the President.
2. “Radiation” refers to electromagnetic wave or corpuscular ray that is able to ionize air directly or indirectly as specified below by the President:
   A. Alpha ray, deuteron ray, proton ray, beta ray, other heavily charged particle beam
   B. Neutron ray
   C. Gamma ray and X -ray
   D. Electro beam with 50,000 electronvolts or higher of energy
3. “Radiation-generating device” refers to the device that generates radiation by accelerating the electrically charged particles as specified by the President in the following:
   A. X-ray generating device
   B. Cyclotron
   C. Synchrotron
   D. Synchrocyclotron
   E. Linear accelerator
   F. Betatron
   G. Van de Graaff accelerator
   H. Cockrofter Walton accelerator
   I. Transformer accelerator
   J. Microtron
   K. Light source
   L. Accelerated ion Implanter
   M. Other devices determined and notified by the the Nuclear Safety and Security Commission
4. “Radiation control area” refers to the area where the external radiation dose rate, the surface contamination by radioactive materials and concentration of radioactive substance in the air are likely to exceed the allowable level stipulated by the regulations of the Nuclear Safety and Security Commission; access control and precautions against radiation hazards are necessary in such area to secure radiation safety.
5. “Radioactive waste” refers to a radioactive substance or a substance contaminated by a radioactive substance (hereinafter referred to as “Radioactive Substances, etc.”) to be disposed of.

6. “Exposed dose of radiation” refers to the radiation dose to which the exterior or the interior of a human body is exposed; however, the radiation dose for medical treatment and natural radiation dose that is not intentionally increased shall be excluded. The types and application standards of radiation dose shall be determined and notified by the Nuclear Safety and Security Commission.
7. “Radiation worker” refers to a person who is or likely to be exposed to radiation by engaging in works such as operation, use and preservation of nuclear facilities or use, handling, storage, treatment, discharge, disposal, transport and other management works of radioactive substances, removal of contamination, etc.,
8. “Sealed radioactive isotope” refers to radioactive isotopes put in a container which is made of an anti-corrosion material and not easily breakable with high mechanical strength, and from which radiation alone, not the radioactive isotopes themselves, may be released while in use.
9. “Radiation dose limit” refers to the maximum level of radiation dose to which both the exterior and the interior are exposed.
10. “Maximum permissible surface contamination” refers to the maximum permissible level of radioactive contamination on the surface of an object or a human body as specified by the Nuclear Safety and Security Commission.
11. “Restricted area” refers to the vicinity of a radiation control area or a preservation area where the exposed dose of radiation at its boundary is likely to exceed the allowable level stipulated by the Commission
12. “Person who frequently accesses radiation control area” refers to a person who frequently accesses a radiation control area for work purposes (excluding temporary visitors) other than a radiation worker.
13. “Self-disposal” refers to incineration, landfill or recycling of radioactive wastes generated under the allowable level of the Nuclear Safety and Security Commission by nuclear operators as stipulated in Article 71 of the Atomic Energy Act.
14. “Discharge” refers to planned and controlled release of liquid or radioactive materials etc., which were generated during normal operation of nuclear reactor facilities, to the outside through drainage or ventilation systems within the specified limits of the Commission.
15. “Annual limit on intake” refers to the limit for the amount of radioactive material taken into the body of a radiation worker in a year, which would result in a committed dose equal to the relevant dose limit stipulated by the Commission.
16. “Derived air concentration” refers to the concentration of radioactive material in the air stipulated by the Commission which, if breathed by a radiation worker man for a working year, results in an intake of one annual limit on intake.
17. “Radiation dose ratio on surface” refers to the ratio of radiation dose measured at a point 10 centimeters away from the surface of a radioactive substance, such as container or device containing radioactive substance, radiation-generating device or radiation shield, etc.
18. “Ventilation system” refers to the equipment that releases gaseous radioactive materials or cleans the air contaminated thereby, including exhaust emission control device, ventilator, exhaust pipe, etc.
19. “Work room” refers to the place where unsealed radioactive isotopes or unsealed objects contaminated by radioactive isotopes are used or packaged.
20. “Contamination inspection room” refers to the place in which whether the surface of a human body or of an object worn by a human including working garments, footwear and protective gear is contaminated by radioactive materials is inspected.
21. “Drainage system” refers to the equipment that purifies or discharges liquid radioactive materials or fluids contaminated thereby, including effluent processing apparatus such as concentrators, separators and ion exchangers or the drainage pipe, drainage passage, etc. of effluent purification tanks such as storage, dilution and filtration tanks.
22. “External radiation dose rate” refers to radiation dose per hour (millisievert/h) exposed from the outside of a human body
23. “The management standards of Pohang University of Science and Technology” refers to the radiation dose limit, surface radiation dose rate, maximum permissible contamination and maximum permissible

concentration stipulated by the President of the University within the specified limits of the Commission in order to secure the radiation safety of those who access nuclear facilities on campus.

24. “General control area” refers to the area, compared to a radiation control area, with lower ambient dose levels where actions are still necessary to secure the radiation safety of those accessing the area
25. “Personal safety and interlock system” refers to a system controlling or preventing radiation exposure from exceeding stipulated levels by interconnecting access control for nuclear facilities on campus and operation plans of radiation generating devices.

Article 4 (Organization) For centralized management of the nuclear facilities on campus (all facilities related to the use, storage and disposal of radioactive isotopes, etc.) the following organization shall be established:

President
Radiation Safety Committee
Radiation Safety Officer
Director of Pohang Accelerator Laboratory
Pohang Accelerator Laboratory/ Radiation Safety Sub-Committee
Deputy Director
Heads of each division
Radiation Safety Team
Organizations using radioactive materials (research institutes on campus)
Radiation safety personnel
Members of Radiation Safety Committee

Article 5 (Duties) Duties of the following organizations and positions are as follows:

1. President of the University

A. The President of the University shall generally direct and supervise tasks related to the handling of radioactive isotopes, etc. and protection against radiation hazards based on advice from the Radiation Safety Committee and the radiation safety officer and assume any and all responsibilities for the operations specified in these regulations.

B. As to the facilities of the Pohang Accelerator Laboratory the aforementioned tasks shall be delegated to the Director of the Pohang Accelerator Laboratory.

2. Director of the Pohang Accelerator Laboratory

A. The Director of the Pohang Accelerator Laboratory shall perform the tasks delegated by the President of the University.

3. Radiation Safety Committee

A. The Radiation Safety Committee shall establish general policy on radioactive isotopes, etc.

B. The Committee shall review and approve matters relating to the use, change and disposal of radioactive isotopes, etc.

C. Meeting: The Committee shall meet every six months.

D. Composition: The Radiation Safety Committee shall consist of the following members:

(1) Provost & Executive Vice President as the Chairperson of the Committee

(2) Professor: A professor with experience of handling radioactive isotopes appointed as a member of the Radiation Safety Committee from each department handling radioactive isotopes, etc.

(3) Radiation safety officer

(4) Representative of the (safety-related) administrative body

radiation generating devices E. For matters related to the Pohang Accelerator Laboratory, the Radiation Safety Sub-Committee may be established and operated separately within the Laboratory.

F. Minutes of meeting, reports and proposals shall be approved by the President of the University.

4. Radiation Safety Sub-Committee of Pohang Accelerator Laboratory

A. The Radiation Safety Sub-Committee shall perform the same role as the Radiation Safety Committee by exercising the authority and duties on radioactive isotopes and etc. of the Pohang Accelerator Laboratory delegated by the Committee.

B. Meeting: The Sub-Committee shall meet every six months.

C. Composition: Deputy Director (Chairperson of the Sub-Committee), heads of each division, radiation

safety officer and others appointed by the Director of the Laboratory

5. Radiation Safety Committee Member

A. Members of the Radiation Safety Committee from each department shall be appointed as the radiation safety officer to assume responsibility for radiation safety within the department.

B. Members of the Radiation Safety Committee from each department must notify the radiation safety officer in advance of the following:

(1) Matters concerning purchase and disposal of radioactive isotopes and etc.

(2) Matters concerning licenses to possess and use radioactive isotopes and etc.

(3) Matters concerning registration, change, cancellation of registration and control of radiation workers

(4) Other matters concerning radiation safety management, such as accidents and incidents

(5) Matters concerning discussion on and modification of resolutions of the Radiation Safety Committee within the department

C. Members of the Radiation Safety Committee shall perform and review regular tasks and other detailed matters on radiation safety that are not determined by the Radiation Safety Committee based on consultation with the radiation safety officer.

6. Radiation Safety Officer

A. A radiation safety officer shall be directed by the President of the University (or Director of the Pohang Accelerator Laboratory) and shall be a member of the Radiation Safety Committee.

B. A radiation safety officer may assist the President of the University (or Director of the Pohang Accelerator Laboratory) and directly report to him/her.

C. If there is a problem that may affect radiation safety, a radiation safety officer may request the use of radioactive isotopes be suspended or corrective actions be taken; such requests shall be restricted only by the directions of the President of the University (or Director of the Pohang Accelerator Laboratory).

D. If a radiation worker violates these regulations or refuses to follow or perform in compliance with reasonable work directions, a radiation safety officer may report in writing to the President of the University (or Director of the Pohang Accelerator Laboratory) on the violation and refusal to perform the duties and request disciplinary action.

E. A radiation safety officer shall not be dismissed or disadvantaged in his/her promotion or advancement as a result of performing his/her duties in good faith according to these regulations or activities stipulated in Article 102 of the Nuclear Safety Act.

F. A radiation safety officer shall perform the following duties:

(1) A radiation safety officer shall review the provisions of the Atomic Energy Act related to radiation safety management so that they may be applied and maintained within the University and present proposals on the radiation safety policy of the University.

(2) He/she shall establish regulations, procedures, education proposals, etc. and supervise their implementation.

(3) He/she shall control radiation exposure so that the maximum permissible radiation dose for a person may not be exceeded.

(4) He/she may permit minor adjustment in the personal safety and interlock system (PSI), while the Radiation Safety Committee shall make decisions on important matters concerning the PSI system and define minor issues.

7. Radiation Safety Personnel (incl. members of the Radiation Safety Team)

A. Radiation safety personnel shall perform the following regular tasks under the direction and supervision of the radiation safety officer; his/her tasks shall include but not be restricted to the following:

(1) Assistance in development of radiation safety regulations

(2) Management of radioactive materials

(3) Regular measurement of radiation

(4) Operation of the personal radiation exposure monitoring system

(5) Inspection and calibration of radiation detectors

(6) Operation of an environmental radiation monitoring program
(7) Control of calibration sources
(8) Operation of the radiation analysis laboratory
(9) Management of radioactive wastes
(10) Management of the PSI system
(11) Operation of the radiation worker training and radiation safety education program

B. If deemed necessary for radiation safety, he/she may advise the head of a department using radioactive isotopes, etc. and a radiation worker or request corrective actions.

C. Relation between radiation safety personnel and radiation worker

(1) Radiation safety personnel shall provide assistance for radiation workers to handle radiation in a safe manner

(2) Radiation workers must be fully aware of his/her working conditions related to radiation safety; if deemed unclear, he/she must immediately consult the radiation safety personnel.

(3) The on-site presence or measures taken by radiation safety personnel shall not exempt radiation workers from the responsibility to perform radiation works in a safe manner. Radiation personnel may not, or be asked to, be engaged in on-site work to fill worker shortage.

8. Each Division

A. Registration work for beamline users
B. Radiation safety education for beamline users pursuant to the scope and methods prescribed by the radiation safety officer
C. Provision and collection of personal dosimeters for beamline users
D. Submission of reference data relating to the application for the permission of newly-built or change of beamline
E. Operation of the beamline interlock system and maintenance of the PSI system
F. Manufacture and installation of beamline and accelerator accessories
G. Operation and maintenance of beamline and accelerator
H. Education for accelerator operators
I. Operation of the research system using electron beam
J. Maintenance of storage ring buildings and linear accelerator
K. Maintenance of clean air system and low-conduction cooling water

Chapter 2 Handling Standard

Section 1 Purchase Standards for Radioactive Isotopes and Radiation Generating Devices

Article 6 (Purchase Procedure of Radioactive Isotopes and Radiation Generating Devices)

① The radiation safety officer may appoint a person handling purchase, receipt, storage, etc., of radioactive isotopes and etc. among radiation workers.

② A person intending to purchase and use radioactive isotopes, etc. must prepare a request for purchase in advance and obtain approval from either the radiation safety officer or the person in charge of purchase.

③ The radiation safety officer or the person in charge of purchase must purchase, receive and transfer the approved radioactive isotopes, etc. to the person who requested the purchase and make all-out efforts to make sure that they are safely used within the authorized range.

Section 2 Facility Standards for Radioactive Isotopes and Radiation Generating Devices

Article 7 (Unsealed Sources) The provisions from Article 16 to Article 23-2 of the Regulations on Technical

Standards for Radiation Safety Management, Etc. shall apply (Other detailed matters shall be based on documented procedures)

Article 8 (Sealed Sources) The provisions from Article 24 to Article 29-2 of the Regulations on Technical Standards for Radiation Safety Management, ETC. shall apply (Other detailed matters shall be based on documented procedures).

Article 9 (Facility Standards for Radiation Generating Devices) The provisions from Article 30 to Article 34-2 of the Regulations on Technical Standards for Radiation Safety Management, ETC. shall apply (Other detailed matters shall be based on documented procedures).

Section 3 Handling Standards for Radioactive Isotopes and Radiation Generating Devices

Article 10 (Unsealed Sources) The provisions from Article 35 to Article 40-2 of the Regulations on Technical Standards for Radiation Safety Management, Etc. shall apply (Other detailed matters shall be based on documented procedures).

Article 11 (Sealed Sources) The provisions from Article 40 to Article 46-2 of the Regulations on Technical Standards for Radiation Safety Management, Etc. shall apply (Other detailed matters shall be based on documented procedures).

Article 12 (Handling Standards for Radiation Generating Devices) The provisions of Article 48 of the Regulations on Technical Standards for Radiation Safety Management, Etc. shall apply (Other detailed matters shall be based on documented procedures).

Section 4 Adjustment and Performance Test of the Personal Safety and Interlock System

Article 13 (Adjustment and Performance Test of the Personal Safety and Interlock System) Adjustment of the personal safety and interlock system shall be permitted only according to the documented procedures of the University and performance test shall be conducted to ensure soundness of the system. The performance test must be conducted preferentially to prevent interruptions from other tasks; regular/irregular inspections and operation after a long period of shutdown, etc. shall be conducted based on documented inspection procedures.

Chapter 3 Transport of Radioactive Materials, Etc.

Section 1 Technical Standards for Packages and Transport Containers

Article 14 (Technical Standards for Packages and Transport Containers) The provisions from Article 89 to Article 94 of the Regulations on Technical Standards for Radiation Safety Management, Etc. shall apply (Other detailed matters shall be based on documented procedures).

Section 2 Technical Standards for Packages and Transport

Article 15 (Technical Standards for Packages and Transport) The provisions from Article 95 to Article 119 of the Regulations on Technical Standards for Radiation Safety Management, Etc. shall apply (Other detailed matters shall be based on documented procedures).

Section 3 Obligations of Consignor, Etc.

Article 16 (Technical Standards for Obligations of Consignor, etc.) The provisions from Article 120 to Article 123 of the Regulations on Technical Standards for Radiation Safety Management, Etc. shall apply

(Other detailed matters shall be based on documented procedures).

Section 4 Technical Standards for Means of Transport

Article 17 (Technical Standards for Means of Transport) The provisions from Article 124 to Article 128 of the Regulations on Technical Standards for Radiation Safety Management, Etc. shall apply (Other detailed matters shall be based on documented procedures).

Chapter 4 Precautions against Radiation Hazards

Article 18 (Designation of Restricted Area) A restricted area shall be designated within the boundary of the Pohang Accelerator Laboratory site so that the effective dose for members of the public does not exceed 1 mSv/year pursuant to the management standards of the Pohang University of Science and Technology.

Article 19 (Designation of General Control Area) The area within the University where the external radiation dose rate exceeds1 mSv/year and does not exceed 400 μSv/week shall be designated as a general control area pursuant to the management standards of Pohang University of Science and Technology.

Article 20 (Designation of Radiation Control Area) The provisions of Article 2, Item 16 of the Nuclear Safety Act shall apply to designate a radiation control area pursuant to the management standards of the University.

① The "limit as prescribed by the regulations of the Nuclear Safety and Security Commission" in Article 2, Item 16 of the Nuclear Safety Act means any of the following:

1. External radiation dose rate: 400 μSv/week
2. Concentration of radioactive materials in the air: Derived air concentration
3. Contamination level on the surface of an object: Permissible surface contamination level

② In an area where the external radiation dose rate, etc. are feared to exceed the limit as provided in Clause 1, each of the following measures shall be taken to control people's access thereto and prevent any radiation hazard to those with access thereto:

1. A radiation control area shall be established.

2. Such compartments as walls and fences shall be used and such signs as specified in the Attached Table 1 shall be attached to define the boundaries of the controlled area. When any person other than radiation workers accesses such area, such person shall be required to follow instructions from the radiation workers.

3. In the case of contamination by radioactive materials of the surface of floors, walls and other objects feared to be contacted by people, the level of such contamination shall not exceed the permissible surface contamination level.

4. If a person leaves or an object is carried out from the radiation control area, the level of contamination by radioactive materials on the surface of a human body, the objects worn by a human including clothing and footwear and the object carried out (If such object is contained in a container or packaged, such container or packaging) shall not exceed one tenth of the permissible surface contamination level.

Article 21 (Access Control to Radiation Control Area) Access to the general control area and the radiation control area (hereinafter referred to as "General Control Area and Etc.") shall be allowed based on the documented procedures prescribed by the President of the University (or Director of the Pohang Accelerator Laboratory); measures shall be taken to prohibit free access to a control area so that such area is entered only pursuant to the following procedure; in the case of access to such area by any person other than radiation workers, such person shall be required to follow instructions from the radiation workers:

1. Access of radiation workers

A. A person who wishes to access a general control area on a regular basis must register as a radiation worker and receive radiation safety education.

B. A person who wishes to access a radiation control area must file an application for radiation work permit and obtain approval of the radiation safety officer.

C. If a person needs to access a high radiation area where radiation levels reach 1mSv/hr or more, he/she

shall consult the radiation safety personnel, prepare a work plan and application for radiation work permit and obtain approval of the radiation safety officer.

2. Access of person other than radiation workers

A. If a person other than radiation workers wishes to access a general control area and etc., he/she must obtain approval of the radiation safety officer in advance while the radiation safety officer shall take adequate measures to ensure radiation safety of such person.

B. Such person must be accompanied by a radiation worker.

C. Such person may not access a high radiation area where radiation levels reach 1mSv/hr or more.

Article 22 (Assessment and Management of Radiation Dose) Article 133 of the Enforcement Rules of the Nuclear Safety Act shall apply and the radiation dose limit of radiation workers shall not exceed the levels stipulated in Article 2, Item 19 (Exposed Radiation Dose) of the Nuclear Safety Act and Article 2, Item 4 (Radiation Dose Limit) of the Enforcement Rules. The management standards of Pohang University of Science and Technology shall be established as follows:

1. Permissible radiation dose of a radiation worker: 20 mSv/year (2,000 mrem/year)

2. Permissible radiation dose of a person who frequently accesses a radiation control area: 6 mSv/year (600 mrem/year)

3. Permissible radiation dose of a member of the public: 1 mSv/year (100 mrem/year)

4. Permissible radiation dose of a temporary visitor: 10 uSv/hour (1 mrem/h) (It shall not exceed the yearly radiation dose limit of members of the public)

Article 23 (Obligation of Radiation Workers) Personal dosimeters provided for the assessment and management of radiation dose of each person may not be used for any purposes other than the measurement of radiation dose for him/herself.

Article 24 (Measurement of Radiation Dose, Etc.) ① Radiation dose shall be measured as follows based on Article 131 (Measurement) of the Enforcement Decree of the Nuclear Safety Act and Article 131 (Place of Measurement) of the Enforcement Rules:

① The place and time of measurement of contamination caused by radiation dose and radioactive substance, etc., shall be as follows:

1. Radiation dose

A. Facilities for use, distribution, storage, and disposal: Before and after radiation-related work and every week

B. Sealed radioactive isotope or radiation generating devices in the fixed and shielded radiation facility: Every month

C. Facilities for storage, handling and disposal of radioactive wastes: Everyday

D. General control area and Radiation control area: Every week

E. Place where radioactive substance leaked abnormally: At each leak

2. Contamination by radioactive substance, etc.

A. Concentration level of radioactive substance in the air and water and the surface of contaminated objects in the radiation control area: Each time work is performed

B. The surface of an object carried out of the radiation control area: Each time such object is carried out

C. Air and water outlets: Each time water or air is discharged

② The subject and time for the measurement of radiation dose and contamination by radioactive substance as prescribed in Clause 1 shall be as follows:

1. Exposed radiation dose

A. The surface of hands, feet, working garments and protective gear of radiation workers or the surface of other parts feared to be contaminated: Each time work is finished

B. The surface of hands, feet, working garments and protective gear of persons who frequently access a radiation control area: Each time he/she comes in and out

C. Person who temporarily accesses the radiation zone and who is likely to be exposed to radiation dose in excess of the radiation dose limit: Each time he/she accesses the zone

③ The method of measurement in Clauses 1 and 2 shall be as follows:

1. The radiation dose and level of contamination shall be measured in a place most appropriate for radiation

measurement.

2. The internal radiation exposure shall be calculated by measuring the concentration level and amount of radioactive substance in the air or drinking water or by performing necessary detailed test.

Article 25 (Medical Examination) ① Parts and items to be tested or examined in medical examination pursuant to Article 132 of the Enforcement Decree of the Nuclear Safety Act shall include the following:

1. Job or exposure history
2. Medical history related to the handling of radiation
3. Clinical inspection or diagnosis
   A. Clinical inspection: Count of leukocytes, thrombocytes, and hemoglobin in peripheral blood
   B. Diagnosis: Symptoms in the eyes, skin, nervous or hematopoietic systems
4. Peripheral blood smear examination and slit lamp microscope examination (limited to cases where an individual's health status is hard to assess by examination under subparagraphs 1 through 3 or where disease is suspected).

② The time of examination pursuant to Article 132 of the Enforcement Decree of the Nuclear Safety Act shall be as follows:

1. Before starting radiation work for the first time
2. A person engaged in radiation work must receive medical examination every year. Medical examination is not required if his/her radiation dose for 12 months since the medical examination in the previous year does not exceed the radiation dose limit of the general public as specified in the Attached Table 1 of the Enforcement Decree of the Nuclear Safety Act.
3. When the radiation dose limit of radiation workers as specified in the Attached Table 1 of the Enforcement Decree of the Nuclear Safety Act has been exceeded

Article 26 (Furnishing Register) ① The following registers related to radiation work shall be furnished for the preservation of records:

1. Date of acquisition, types, quantity, and number of units of radioactive isotopes in use and radiation generating devices
2. Date of use, purpose, method and place of use, name of person involved in the use (Register for use of unsealed/sealed radioactive isotope, register for use of radiation generating devices)
3. Date and time, method and place of disposal of radioactive isotope, and name of person involved in the disposal (Register for disposal)
4. Types and quantity of radioactive isotopes to be disposed of (Register for disposal)
5. Matters related to the measurement of radiation dose of an individual (Register for radiation dose)
6. Matters related to the medical examination results of an individual (Register for medical examination)
7. Matters related to education and training on radiation hazards prevention (Register for education and training)
8. Matters related to the measurement of radiation dose rates and contamination levels (Register for the measurement of radiation dose rate, Register for contamination measurement)
9. Matters related to purchase record (Request for purchase)
10. Other matters necessary to prevent radiation hazards

② Records in Items 5 and 6 of Clause 1 shall be kept until the site is closed; the record in Item 8 shall be kept for 10 years, and other records, for five years.

③ The records in the registers in Clause 1 shall be signed by the radiation safety officer and the head of department.

Article 27 (Education and Training) ① The existing as well as new radiation workers persons accessing radiation facilities for repair, etc., people on tour and visitors should not be subject to unnecessary exposure to radiation due to radioactive sources or certain acts; education and training on the safe handling of radiation and matters to be observed, etc., shall be provided if necessary and periodically (two to three times a year) so that counteractions can be taken in the case of exposure to radiation.

② The education provided to existing and new workers shall be conducted based on the content and hours stipulated in Article 138 of the Enforcement Rules of the Nuclear Safety Act. In accordance with the Act on the Establishment and Operation of Public Interest Corporations, basic education shall be executed by a

corporation established with the Committee's approval. The education content shall include the following:

1. Basic education

a. Safety control in respect to the use of nuclear facilities;

b. Handling of radioactive materials, etc.;

c. Protection against radiation hazards;

d. Radiation safety control regulations and related laws; and

e. Education according to the characteristics of a user company.

2. on-the-jot education

a. Radiation safety management regulations of the user business

b. Characteristics of radiation sources and equipment of the user business

c. Education based on other characteristics of the user business

③ The on-the-jot education plan shall include the following:

1. In the case of internal education:

a. Education schedule

b. Textbook by student group

c. Information concerning instructors

d. Information concerning education facilities

e. Information concerning evaluation

2. In the case of outsourced education: Details of outsourcing and outsourced agency

④ New radiation workers must receive a minimum of 12 hours of radiation safety education before accessing a general control area, and later a minimum of six hours every year. Persons who frequently access a radiation control area must receive safety education when accessing such as safety rules on prevention of hazards, etc.

⑤ An orientation on the safety management rules conducted by a guide before accessing corresponding facilities may substitute for the education of persons who access for licensing, inspection and other safety regulation purposes, who are responsible for the operation of facilities, who are escorted by the radiation safety officer or a radiation worker and other persons who temporarily access a general control area, etc.

⑥Notwithstanding the provisions in Clauses 1 and 3, when radioactive substance is transported, the workers who engage in the transport shall be given separate safety education prior to transport.

⑦The radiation safety officer, when providing the education pursuant to the provisions in Clauses 1 -5, must test the radiation workers and make sure that they are fully familiar with safety-related matters.

⑧The radiation safety officer must prepare an education plan for the next year (including content, period, instructor, instruction materials) for approval by the President of the University (or Director of the Pohang Accelerator Laboratory), submit it to the Nuclear Safety and Security Commission by December 31, and provide education to radiation workers in accordance with the plan.

Article 28 (Maintenance of Radiation Safety Equipment) ① The radiation safety equipment shall be calibrated during the period of certification and correction as specified by the Director of the Korean Agency for Technology and Standards and immediately shall be calibrated if an abnormal condition occurs to keep it in good condition at all times for normal operation. The equipment shall be stored in a place where humidity and temperature are appropriately set to prevent measurement error when measuring radiation dose rates, etc. Fixed radiation safety equipment may be calibrated once every year or during the calibration period as specified in the related manual. Mobile radiation safety equipment shall be calibrated during the period as recommended by the equipment manufacturer.

② The necessary equipment for safety management shall be furnished in the radiation control area, etc.

③ Certification and correction labels must be attached to the radiation safety equipment so that users can check if it has been certified and corrected prior to use. In this case, the certification and correction plan shall be established to make sure that radiation-related work is not hampered due to the intensive use of the radiation meter or pocket dosimeter in a certain period of time.

Article 29 (Actions for Person Exposed to Radiation, Etc.) The following actions shall be taken for a person exposed to radiation by the President of the University pursuant to Article 91, Item 3 of the Nuclear Safety

Act:

1. If a radiation worker or a person who frequently accesses a radiation control area was exposed to radiation, or he/she is likely to have been exposed, actions such as limiting the time, prohibition of entry/exit to and from the general control area and etc., or transfer to work where exposure to radiation is less likely must be taken depending on severity of exposure.
2. If a person who temporarily accesses the general control area and etc. is or is likely to have been exposed to radiation, necessary health actions such as diagnosis by a medical doctor, etc., must be taken immediately.

Article 30 (Protection against Hazards and Report) ① If a hazard is likely to occur or such occurred on a radiation facility or a radioactive substance, the following safety actions shall be taken by the President of the University:

1. If the safety of nuclear facilities or radiation workers' performance of work related to safety operation is threatened due to natural disasters such as earthquake, fire, flooding, typhoon, and leak of harmful gas, necessary actions must be taken for the removal of the cause and prevention of spread of damage/loss.
2. If the safety of nuclear facilities is threatened due to the occurrence of failure, etc., of the facility, the facility must be restored to normal condition by removing the cause of failure. If restoration to normal condition is highly unlikely, however, necessary actions shall be taken for preventing the recurrence of failure, etc.
3. If the levels of radiation concentration in the air and water at the boundary of the restricted area are in excess of those specified by the Nuclear Safety Committee because of abnormal leak of the radioactive substance, etc., or a radiation worker or a person who frequently accesses the radiation control area is exposed to radiation dose in excess of the limit specified by the Nuclear Safety Committee, the following actions must be taken:
   A. Emergency evacuation announcement for people in and around nuclear facilities and restricted area
   B. Emergency actions such as rescue and evacuation of a person exposed to radiation hazards or likely to be exposed to such hazards
   C. Prevention of the spread of contamination and removal of contamination in the case of contamination by radioactive substance, etc.
   D. If radioactive substance, etc., can be transported to other places, the safe transport of such substance and installation of signboards around such places as determined by the Radiation Safety Committee and prohibition of unauthorized person(s)'s entry and exit to/from and access to such place
   E. If emergency work related to radiation is performed, adequate protective gears shall be used and time of radiation exposure of emergency workers must be cut short.

After taking such actions, the following matters pursuant to the determination of the Nuclear Safety Committee must be reported to the Chairperson of the Nuclear Safety Committee:

(1) Date, place, and cause of the emergency situation described in Clause 1
(2) Situation of the radiation hazard that took place or that of the potential hazard
(3) Details and plan of safety actions

Article 31 (Actions in Accidents) ① "Leaks, fire and other accidents" in the Nuclear Safety Act shall mean any of the following:

1. If environmental contamination is likely or the safety of radiation workers is threatened by the leakage or escape of a radioactive substance
2. If fire breaks out on the transporting vehicle or radioactive substances and the leakage of radioactive substances is likely
3. A radiation worker or a person who frequently accesses a radiation control area is exposed to radiation over the dose limit
4. If packages transported from a foreign country do not conform to the transport standards stipulated in the Atomic Energy Act and its Enforcement Decree
5. Radioactive substance, etc., are stolen or lost.
6. The emergency evacuation of neighboring residents is required due to the leak of radioactive substance.

② Article 74 of the Nuclear Safety Act shall apply *mutatis mutandis* to the safety measures to be taken by

the President of the University or the person commissioned to transport radioactive materials in the event of accidents described in Clause 1.

③ Any of the accidents described in Clause1, Item 5 and Item 6 must immediately be reported upon their occurrence to the police station having jurisdiction over the district.

Article 32 (Report) The following matters shall be reported to the Director of the Korea Institute of Nuclear Safety within the prescribed period of time:

1. Acquisition, use, possession, and disposal status of radioactive isotope (within 30 days of the end of each quarter)
2. Status of objects transported domestically and shipped out of the country (within 30 days of the end of each year)
3. Medical checkup results of radiation workers (within 2 weeks of receiving medical checkup result)

Article 33 (Limitation of Work) The following persons shall not engage in radiation-related work:

1. Person who has not been educated and trained in accordance with these regulations
2. Person whose health has not been checked in accordance with these regulations
3. Person who has not been given a personal dosi meter
4. Person under 18 years of age
5. Person deemed unsuitable for radiation-related work by the radiation safety officer

Article 34 (Other Matters) "The Nuclear Safety Act," "The Enforcement Decree of the Nuclear Safety Act," "The Enforcement Rules of the Nuclear Safety Act," and "The Regulations on Technical Standards for Radiation Safety for Radiation Safety Management, Etc" shall apply to other necessary matters. Notwithstanding these regulations, if atomic energy-related laws (Act, Enforcement Decree, Implementation Rules, public announcement) are amended, their provisions shall apply.

Addendum

These regulations shall be established and take effect on November 1, 1987.

Addendum

These amended regulations shall take effect on December 29, 1995.

Addendum

These amended regulations shall take effect on August 5, 1997.

Addendum

These amended regulations shall take effect on May 25, 1998.

Addendum

These amended regulations shall take effect on June 29, 2012.

Addendum

These amended regulations shall take effect on June 2, 2014.