

**STATE OF SOUTH CAROLINA
RULES AND REGULATIONS FOR
RADIATION CONTROL**

**TITLE C
PARTICLE ACCELERATORS**



SOUTH CAROLINA STATE BOARD OF HEALTH

APRIL, 1969

**S. C. STATE BOARD OF HEALTH
DIVISION OF RADIOLOGICAL HEALTH
J. MARION SIMS BUILDING
COLUMBIA, S. C. 29201**

TITLE C

**STATE OF SOUTH CAROLINA
BOARD OF HEALTH**

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FOR CONTROL OF
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STATE OF SOUTH CAROLINA BOARD OF HEALTH RULES AND REGULATIONS FOR CONTROL OF PARTICLE ACCELERATORS

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TITLE C

PART I

GENERAL PROVISIONS

- RHC 1.1** **Scope.** Except as otherwise specifically provided, these regulations apply to all persons who develop, manufacture, receive, possess, use, own, or acquire particle accelerators.
- RHC 1.2** **Definitions of Terms as Used in This Part.**
- 1.2.1 "Accelerator facility" means the location at which one or more particle accelerators are installed within one building or under one roof and are operated under the same administrative control.
- 1.2.2 "Act" means Act No. 223, Atomic Energy and Radiation Control Act enacted by the 1967 Session South Carolina Legislature.
- 1.2.3 "Agency" means the South Carolina State Board of Health.
- 1.2.4 "Calendar quarter" means not less than 12 consecutive weeks nor more than 14 consecutive weeks. Calendar quarters shall be so arranged that no day in any year is omitted from inclusion within a calendar quarter. No registrant shall change the method observed by him of determining calendar quarters for purposes of these regulations, except at the beginning of a calendar year.
- 1.2.5 "Occupational dose" means exposure of an individual to radiation (i) in a restricted area; or (ii) in the course of employment in which the individual's duties involve exposure to radiation; provided, that occupational dose shall not be deemed to include any exposure of an individual to radiation for the purpose of medical diagnosis, analysis or therapy of such individual.
- 1.2.6 "Particle accelerator" means any machine capable of accelerating electrons, protons, deuterons, or other nuclear particles in a vacuum and discharging these particles into a medium external to the accelerating device.
- 1.2.7 "Person" means any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, agency, political subdivision of this State, any other state or political subdivision or agency thereof,

and any legal successor, representative, agent or agency of the foregoing, other than the United States Atomic Energy Commission, and other than Federal Government Agencies licensed by the United States Atomic Energy Commission.

- 1.2.8 "Personnel monitoring equipment" means devices designed to be carried or worn by an individual for the purpose of measuring the dose which an individual receives (e.g. film badges, film rings, pocket chambers, pocket dosimeters, thermoluminescent dosimeters, etc.).
- 1.2.9 "Radiation" means gamma rays, x-rays, alpha and beta particles, highspeed electrons, neutrons, and other nuclear particles; but not sound or radio waves, or visible, infrared, or ultra-violet light.
- 1.2.10 "Radiation protection officer" means any person directly responsible for protection against radiation.
- 1.2.11 "Restricted area" means any area to which access is controlled by the registrant for the purpose of protection of individuals from exposure to radiation. "Restricted area" shall not include any areas used for residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area.
- 1.2.12 "Source of radiation" means any radioactive material or any device or equipment emitting or capable of producing radiation.
- 1.2.13 "Survey" means an evaluation of the radiation incident to the production, use, release, disposal, or presence of sources of radiation under a specific set of conditions. When appropriate, such evaluation includes a physical survey of the location of equipment and measurements of levels of radiation.
- 1.2.14 "These regulations" means Parts I, II, III, and IV.
- 1.2.15 "Unrestricted area" means any area access to which is not controlled by the registrant for purposes of protection of individuals from exposure to radiation and any area used for residential quarters.
- 1.2.16 "Whole body" means the entire body or a major portion thereof, or the head and trunk, or the active blood forming organs, or the lens of the eyes, or the gonads. Whole body does not refer to the skin of the whole body.

RHC 1.3 Units of Radiation Dose.

- 1.3.1 "Dose" is the quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body. When these regulations specify a dose during a period of time, the dose means the total quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body during such period of time. Several different units of dose are in current use.
- 1.3.2 The "rad" is a measure of the dose of any radiation to body tissue in terms of the energy absorbed per unit mass of the tissue. One rad is the dose corresponding to the absorption of 100 ergs per gram of tissue. (One millirad [mrad] = 0.001 rad).
- 1.3.3 The "rem" is a measure of the dose of any radiation to body tissue in terms of its estimated biological effect relative to a dose of one Roentgen (R) of x-rays. (One millirem [mrem] = 0.001 rem). The relation of the rem to other dose units depends upon the biological effect under consideration and upon the conditions of irradiation. For the purposes of these regulations, any of the following is considered to be equivalent to a dose of one rem:
- 1.3.3.1 A dose of 1 R due to X- or gamma radiation;
- 1.3.3.2 A dose of 1 rad due to X-, gamma or beta radiation;
- 1.3.3.3 A dose of 0.1 rad due to neutrons or high energy protons.
- 1.3.4 The "roentgen" is a unit of exposure to radiation. It is the amount of gamma or x-rays required to produce ions carrying one electrostatic unit of electrical charge in one cubic centimeter of dry air under standard conditions.

RHC 1.4 Inspections.

- 1.4.1 Each registrant shall afford, at all reasonable times, the Agency or its duly authorized representative the opportunity to inspect particle accelerators and the premises and facilities wherein such particle accelerators are used or stored.
- 1.4.2 The Agency may immediately impound or order the impounding of particle accelerators, in the possession of any person who is not equipped to observe these regula-

tions or provisions of the Act, or when the Agency deems a situation to constitute an emergency.

- 1.4.3 Each registrant shall make available to the Agency or its authorized representative for inspection, upon reasonable notice, records maintained pursuant to these regulations.

RHC 1.5 Tests and Surveys.

- 1.5.1 Each registrant shall make or cause to be made such surveys as are necessary for him to comply with these regulations.
- 1.5.2 Each registrant shall perform, upon instructions from the Agency, or shall permit the Agency to perform, such reasonable tests as the Agency deems appropriate or necessary including, but not limited to, tests of:
- 1.5.2.1 Particle Accelerators;
 - 1.5.2.2 Facilities wherein particle accelerators are used or stored;
 - 1.5.2.3 Radiation detection and monitoring instruments; and
 - 1.5.2.4 Other equipment and devices used in connection with utilization or storage of registered particle accelerators.

RHC 1.6 Exemptions.

- 1.6.1 The Agency may, upon application therefor or upon its own initiative, grant such exemptions or exceptions from the requirements of these regulations as it determines are authorized by law and will not result in undue hazard to public health and safety or property.

RHC 1.7 Additional Requirements.

- 1.7.1 The Agency may, by rule, regulation, or order, impose upon any registrant such requirements in addition to those established in these regulations as it deems appropriate or necessary to minimize danger to public health and safety or property.

RHC 1.8 Violations.

- 1.8.1 The Agency may obtain an injunction or other court order prohibiting any violation or any provision of the Act or any regulation or order issued thereunder. Any person who willfully violates any provision of the Act

or any regulation or order issued thereunder shall be guilty of a misdemeanor and, upon conviction, shall be punished by fine or imprisonment or both, as provided by the Act.

RHC 1.9 Records.

- 1.9.1 Each registrant shall keep records showing the receipt, transfer, and disposal of all particle accelerators and any other records as specifically required by these regulations.

RHC 1.10 Communications.

- 1.10.1 All communications and reports concerning these regulations and registrations filed thereunder, should be addressed to the Agency at its office located at:

S. C. State Board of Health
Division of Radiological Health
J. Marion Sims Building
2600 Bull Street
Columbia, South Carolina 29201

TITLE C

PART II

STANDARDS FOR PROTECTION AGAINST RADIATION

RHC 2.1 Purpose and Scope. This part establishes standards for protection against radiation hazards. Except as otherwise specifically provided, this part applies to all registrants.

RHC 2.2 Exposure of Individuals to Radiation in Restricted Areas.

2.2.1 Except as provided in RHC 2.2.2 no registrant shall possess, use, receive, or transfer particle accelerators in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter from all sources of radiation in the registrant's possession a dose in excess of the limits specified in the following table:

	Rems Per Calendar Quarter
Whole Body; Head and Trunk; Active Blood-Forming Organs; Lens of Eyes; or Gonads.	1¼
Hands and Forearms; Feet and Ankles.	18¾
Skin of Whole Body.	7½

2.2.2 A registrant may permit an individual in a restricted area to receive a dose to the whole body greater than that permitted under Part RHC 2.2.1 provided:

2.2.2.1 During any calendar quarter the dose to the whole body from sources of radiation in the registrant's possession shall not exceed 3 rems; and,

2.2.2.2 The dose to the whole body, when added to the accumulated occupational dose to the whole body, shall not exceed 5(N-18) rems, where "N" equals the individual's age in years at his last birthday.

2.2.2.3 The registrant has determined the individual's accumulated occupational dose to the whole body on Agency Form SC-RHA-30, or on a clear and legible record containing all the information required in that form, and has otherwise complied with the requirements of RHC 2.2.3.

2.2.3 In determining an individual's accumulated occupational dose for purpose of 2.2.2.2, the registrant shall make a reasonable effort to obtain reports of the individual's previously accumulated occupational dose. For each period for which the registrant obtains such reports, the registrant shall use the dose shown in the report. The dose may be noted as zero for any periods for which it can be demonstrated that the individual was not occupationally exposed to radiation. In any case where a registrant is unable to obtain reports of the individual's occupational dose for a previous complete calendar quarter, it shall be assumed that the individual has received the occupational dose specified in whichever of the following columns apply:

Part of body	Assumed dose in rems for calendar quarters prior to January 1, 1961	Assumed dose in rems for calendar quarters beginning on or after January 1, 1961
Whole body, gonads, active blood-forming organs, head and trunk, lens of eye	3.75	1.25

The registrant shall retain and preserve records used in determining the individual's accumulated occupational dose on Agency Form SC-RHA-30, or a clear and legible record containing all the information required on said form. The form used shall be signed by the individual involved to certify that the information is correct to the best of his knowledge. If calculation of an individual's accumulated occupational dose for all periods prior to January 1, 1961, yields a result higher than the applicable accumulated dose value for the individual as of that date, as specified in 2.2.2, the excess may be disregarded.

RHC 2.3 Exposure of Minors. No registrant shall permit the operation of any source of radiation in such a manner as to cause any individual within a restricted area, who is under 18 years of age, to receive in any period of one calendar quarter from all sources of radiation in such registrant's possession a dose in excess of 10 percent of the limits specified in the table in subsection RHC 2.2.1.

RHC 2.4 Permissible Levels of Radiation From External Sources in Unrestricted Areas.

2.4.1 Except as provided by the Agency pursuant to paragraph 2.4.2 of this section, no registrant shall permit the operation of any particle accelerator in such a manner as to create in any unrestricted area from such particle accelerators in his possession:

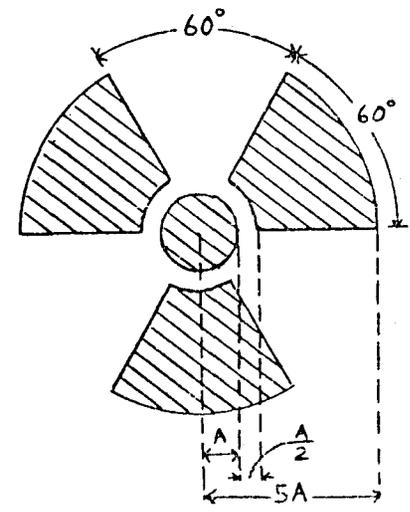
2.4.1.1 Radiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of two millirems in any one hour; or,

2.4.1.2 Radiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of 100 millirems in any seven consecutive days.

2.4.2 Any person may apply to the Agency for proposed limits upon levels of radiation in unrestricted areas in excess of those specified in subsection 2.4.1 of this section resulting from the applicant's possession or use of particle accelerators. Such applications should include information as to anticipated average radiation levels and anticipated occupancy times for each unrestricted area involved. The Agency will approve the proposed limits if the applicant demonstrates to the satisfaction of the Agency that the proposed limits are not likely to cause any individual to receive a dose to the whole body in any period of one calendar year in excess of 0.5 rem.

RHC 2.5 Radiation Symbol. Except as otherwise authorized by the Agency, symbols prescribed by this Part shall use conventional radiation caution colors (magenta or purple on yellow background). The symbol prescribed by this section is the conventional three-bladed design.

2.5.1 Three-bladed design and lettering is to be magenta or purple; background is to be yellow.



RHC 2.6 Caution Signs.

2.6.1 Each registrant shall conspicuously post in each applicable area a sign or signs bearing the radiation symbol and the words:

2.6.1.1 CAUTION RADIATION AREA if such area is a radiation area; or

2.6.1.2 CAUTION HIGH RADIATION AREA if such area is a high radiation area.

2.6.2 "Radiation area" means any area, accessible to individuals, in which there exists radiation at such levels that the whole body could receive in any one hour a dose in excess of 5 millirems, or in any five (5) consecutive days a dose in excess of 100 millirems.

2.6.3 "High Radiation Area" means any area, accessible to individuals, in which there exists radiation at such levels that the whole body could receive in any one hour a dose in excess of 100 millirems.

2.6.4 In addition to the contents of signs prescribed in this section, a registrant may provide on or near such signs and labels any additional information which may be appropriate in aiding individuals to minimize exposure to ionizing radiation.

RHC 2.7 Personnel Monitoring. Each registrant shall supply appropriate personnel monitoring equipment to, and shall require the use of such equipment by:

2.7.1 Each individual who enters a restricted area under such circumstances that he receives, or is likely to receive, a dose in any calendar quarter in excess of 25 percent of the applicable value specified in 2.2.1.

2.7.2 Each individual under 18 years of age who enters a restricted area under such circumstances that he receives, or is likely to receive, a dose in any calendar quarter in excess of 5 percent of the applicable value specified in 2.2.1.

2.7.3 Each individual who enters a high radiation area.

2.7.4 Such other individuals as the Agency deems necessary.

RHC 2.8 Records.

2.8.1 Each registrant shall maintain records showing the radiation exposure of all individuals for whom personnel monitoring is required under RHC 2.7. The official record of radiation exposure is that obtained by the film badge or other personnel dosimeter approved by the Agency. The results of these evaluations shall be retained as permanent records.^W

RHC 2.9 Notification of Incidents.

2.9.1 Immediate notification. Each registrant shall immediately notify the South Carolina State Board of Health, Division of Radiological Health, J. Marion Sims Building, Room 137, 2600 Bull Street, Columbia, South Carolina 29201, by telephone and confirming letter of any incident involving any particle accelerator possessed by him, which may have caused or threatens to cause:

2.9.1.1 Exposure of the whole body of any individual to 25 rems or more radiation; exposure of the skin

of the whole body of any individual to 150 rems or more of radiation; or exposure of the feet, ankles, hands, or forearms of any individual to 375 rems or more of radiation.

2.9.2 Twenty-four hour notification. Each registrant shall within 24 hours notify the South Carolina State Board of Health, Division of Radiological Health, J. Marion Sims Building, Room 137, 2600 Bull Street, Columbia, South Carolina 29201, by telephone and confirming letter of any incident involving any particle accelerator possessed by him, which may have caused or threatens to cause:

2.9.2.1 Exposure of the whole body of any individual to 5 rems or more of radiation; exposure of the skin of the whole body of any individual to 30 rems or more of radiation; or exposure of the feet, ankles, hands, or forearms to 75 rems or more of radiation.

2.9.3 Any report filed with the Agency pursuant to this section shall be prepared in such a manner that names of individuals who have received exposure to radiation will be stated in a separate part of the report.

RHC 2.10 Reports of Overexposure.

2.10.1 In addition to any notification required by RHC 2.9 each registrant shall make a report in writing within 10 days to the South Carolina State Board of Health, Division of Radiological Health, J. Marion Sims Building, Room 137, 2600 Bull Street, Columbia, South Carolina 29201: of

2.10.1.1 Each exposure of an individual to radiation in excess of any applicable limit as set forth in these regulations or as otherwise approved by the Agency.

2.10.1.2 Any incident for which notification is required by RHC 2.9; and

2.10.1.3 Levels of radiation (whether or not involving excessive exposure of any individual) in an unrestricted area in excess of 10 times any applicable limit as set forth in these regulations or as otherwise approved by the Agency.

^W Note: Exposure records may be kept on Agency Form SC-RHA-40 or a clear and legible record containing all the information required on said form and shall be for periods of time not exceeding one calendar quarter.

2.10.1.4 Each report required under this regulation RHC 2.10 shall describe the extent of exposure of individuals to radiation; levels of radiation involved; the cause of the exposures; and corrective steps taken or planned to assure against a recurrence.

2.10.2 Any report filed with the Agency pursuant to this section shall be prepared in such a manner that names of individuals who have received exposure to radiation will be stated in a separate part of the report.

RHC 2.11: Instruction of and Reports to Personnel.

2.11.1 Each registrant shall inform individuals working in or frequenting any portion of a restricted area as to the presence of radiation or particle accelerators; instruct such individuals in safety problems associated therewith and in precautions or procedures to minimize radiation exposure; instruct such individuals in the provisions of Agency regulations for the protection of personnel from exposures to radiation; and shall advise such individuals of reports of radiation exposure which those individuals may request pursuant to this Part.

2.11.2 Each registrant shall keep available for examination upon request a current copy of the applicable Parts of these regulations, and a copy of operating procedures applicable to work with particle accelerators.

2.11.3 Employees working in or frequenting any portion of a restricted area shall be shown a current copy of Agency Form, "Notice to Employees", SC-RHA-20.⁽²⁾

2.11.4 Each registrant shall provide to any individual an annual report of his radiation exposure as shown in records pursuant to 2.8 at the request of such individual.

2.11.5 Each registrant shall provide, at the request of any individual formerly employed by or associated with the registrant, a report of his exposure as shown in records maintained pursuant to 2.8. The individual request shall include appropriate identifying data, such as social security number and dates and locations of employment or association. Such report shall be furnished within 30

days from the time the request is received and shall cover each pertinent calendar quarter. The report shall be in writing and shall include the following statement: "This report is furnished to you under the provisions of the South Carolina State Board of Health 'Radiation Control Regulations.' You should preserve this report for future reference".

2.11.6 In any case where the registrant is required, pursuant to 2.10 to report to the Agency any exposure to an individual to radiation, he shall also notify such individual of the nature and extent of exposure. Such notice shall include a statement identical to that provided for in 2.11.5.

⁽²⁾ Note: Copies of Form SC-RHA-20 may be obtained from the S. C. State Board of Health, Division of Radiological Health, J. Marion Sims Building, Room 137, 2600 Bull Street, Columbia, South Carolina 29201.

RHC 3.5 Radiation Monitoring.

- 3.5.1 Portable radiation monitoring equipment must be properly maintained and available at the accelerator facility.
- 3.5.2 An appropriate radiation monitor shall be used for all accelerator target rooms and other high radiation areas. This monitor shall be one of the following:
 - 3.5.2.1 An area monitor with an easily observable indicator located near the entrance that warns of radiation levels above a predetermined limit;
 - 3.5.2.2 A personal radiation monitor of the "chirpie" type carried into the room;
 - 3.5.2.3 A portable survey instrument carried into the room; or
 - 3.5.2.4 A monitor approved by the Agency.
- 3.5.3 No registrant shall permit any person to enter a restricted area unless each person wears either a film badge, a pocket dosimeter, or pocket chamber. Pocket dosimeters and pocket chambers shall be capable of measuring doses from zero to at least 200 milliroentgens. A film badge shall be assigned to and worn by only one person.

RHC 3.6 Radiation Surveys.

- 3.6.1 The registrant shall maintain sufficient calibrated and operable radiation survey instruments to make physical radiation surveys as required by this part and Part II of these regulations. Each radiation survey instrument shall be response checked every three months and calibrated once a year. After each instrument servicing, a record shall be maintained of the latest response check or calibration date.
- 3.6.2 Before a new accelerator with its associated components be placed in routine operation, a radiation protection survey shall be made by a qualified expert.
- 3.6.3 The area surrounding a particle accelerator and associated components shall be surveyed at intervals not to exceed three months. A record shall be made of the accelerator operating conditions and radiation levels measured at specific control points. These control points must be well defined and reported on at least four consecutive surveys. One of these control points must be at the normal work station of the operator.

RHC 3.7 Minimum Subjects to be Covered in Training of Particle Accelerator Operators.

- 3.7.1 Fundamentals of Radiation Safety
 - 3.7.1.1 Characteristics of beta, gamma, and x-radiation.
 - 3.7.1.2 Units of radiation dose (mrem).
 - 3.7.1.3 Hazards of excessive exposure to radiation.
 - 3.7.1.4 Levels of radiation from particle accelerators.
 - 3.7.1.5 Methods used to prevent radiation exposure at the specific facility to be operated:
 - 3.7.1.5.1 Shielding.
 - 3.7.1.5.2 Interlock system.
 - 3.7.1.5.3 Safety rules.
 - 3.7.1.5.4 Radiation monitoring equipment.
- 3.7.2 All operators shall be instructed on the use and care of personnel monitoring equipment employed at the facility.
- 3.7.3 All operators shall be familiar with the location and use of all operating controls.
- 3.7.4 All operators shall be familiar with the requirements of pertinent State regulations.
- 3.7.5 All operators shall be familiar with the Registrant's written operating and emergency procedures.
- 3.7.6 All operators shall receive at least one month of on-the-job training before assuming operational responsibility.
- 3.7.7 All operator's assistants or helpers shall be indoctrinated on the subjects listed in Items 3.7.1 through 3.7.5.

RHC 3.8 Training of Development, Test, and Maintenance Personnel. Minimum requirements for technical personnel who shall be responsible for the performance of accelerator equipment shall be as follows:

- 3.8.1 Technical personnel shall be indoctrinated on the subjects listed in RHC 3.7.1 through 3.7.5.
- 3.8.2 Technical personnel who are to perform or directly supervise modifications, tests or maintenance work must demonstrate the following capabilities to the radiation safety officer:
 - 3.8.2.1 Ability to read and understand electrical diagrams.
 - 3.8.2.2 A thorough knowledge of the principles and operation of the accelerator.

TITLE C

PART III

RADIATION SAFETY REQUIREMENTS FOR PARTICLE ACCELERATORS

RHC 3.1 **Scope.** The regulations in this part establish radiation safety requirements for all registered particle accelerators or facilities.

RHC 3.2 **Definitions as Used in This Part.**

3.2.1 "Emergency Procedure" means the pre-planned steps to be taken in the event of actual or suspected exposure of individuals to excessive radiation. This procedure shall include the names and telephone numbers of individuals to be contacted as well as directives for processing the film badge or other personnel monitoring device.

3.2.2 "Maintenance Personnel" means persons qualified by training and experience as defined in RHC 3.8 to perform modifications, tests, repairs, or preventive maintenance on the particle accelerators.

3.2.3 "Operating Procedures" means detailed instruction including but not limited to the normal operation of movable shielding, closing of interlock circuits, and manipulation of accelerator controls.

3.2.4 "Operator" means a person qualified by training and experience as defined in RHC 3.7 to assume responsibility for the safe operation of a particle accelerator.

RHC 3.3 **Control of Particle Accelerator Operation.**

3.3.1 Each particle accelerator facility shall be under the administrative control of a radiation protection officer or radiation safety committee, who will be responsible for the safe operation of the accelerator.

3.3.2 Written operating and emergency procedures as well as specified safety rules shall be established for each accelerator facility and approved by the radiation protection officer.

3.3.3 Operators and maintenance personnel shall be familiar with and have available a copy of the written operating and emergency procedures.

3.3.4 No individual shall be permitted to act as an "Operator" of an accelerator until such person has received at least the minimum training specified in RHC 3.7.

3.3.5 Modification, repairs, or preventive maintenance on accelerator components or safety interlocks may be performed only by or under the direct supervision of persons who have received at least the minimum training specified in RHC 3.8.

3.3.6 Provisions shall be made at each accelerator control console to display the operator's name. Only the operator whose name is displayed may turn on the accelerator or open entrances to High Radiation Areas.

3.3.7 The radiation safety officer shall maintain current list of all operators and technical personnel who are qualified to service the particle accelerator.

3.3.8 No registrant shall permit a particle accelerator to operate at any time with a safety interlock bypassed, except for necessary testing.

RHC 3.4 **Equipment Controls.**

3.4.1 All meters and controls on the accelerator control console shall be clearly identified and easily discernible.

3.4.2 Accelerator control consoles shall be equipped with a keyswitch or other device which will render the console inoperative when the key or device is removed.

3.4.3 All entrances into a target room or other high radiation area shall be provided with multiple interlocks.

3.4.4 The interlock system shall be designed to prevent re-starting of the accelerator without manually resetting the accelerator "ON" switch at the control console after the tripping of a shielding interlock or a power failure.

3.4.5 A scram button or other emergency power cut-off switch shall be located and easily identifiable in all accessible high radiation areas.

3.4.6 All shielding that is temporary, movable, or detachable shall be interlocked.

3.4.7 Electrical circuit diagrams of the accelerator and the associated interlock systems shall be kept current and on file at each accelerator facility.

3.4.8 All safety and warning devices, including interlocks, shall be checked and appropriately serviced after each 500 hours of operation, and at intervals not to exceed six months.

- 3.8.2.3 A thorough knowledge of the safety interlock system.
- 3.8.2.4 Ability to understand, use, and check the operation of radiation survey instruments.
- 3.8.3 Technical personnel who perform checks on interlock circuits shall be qualified as "Operators."

TITLE C

PART IV

REGISTRATION OF PARTICLE ACCELERATORS

- RHC 4.1 Purpose.** This part provides for the registration of particle accelerators.
- RHC 4.2 Registration Procedures.**
 - 4.2.1 The owner or person having possession of any particle accelerator, except those specifically exempted in Sections RHC 4.10, 4.11, and 4.12, shall register such particle accelerator with the Agency within one hundred and eighty (180) days following the effective date of these regulations or within ten (10) days after acquisition of the particle accelerator. Registration shall be on form RHX-1 (available from the Agency) or by letter as provided in RHC 4.9.
- RHC 4.3 Radiation Protection Officer.**
 - 4.3.1 The registrant shall designate an individual who will be responsible for radiation protection for the particle accelerator. Such individual shall:
 - 4.3.1.1 Be qualified by training and experience concerning all hazards and precautions involved in operating the particle accelerator for which he is responsible.
 - 4.3.1.2 Recommend a detailed program of radiation safety for effective compliance with the applicable requirements of these regulations.
 - 4.3.1.3 Give instructions concerning hazards and safety practices to individuals who may be exposed to radiation from the particle accelerators.
 - 4.3.1.4 Make surveys and carry out other procedures as required by these regulations.
- RHC 4.4 A Notice of Registration** will be provided by the Agency and shall be retained by the registrant for the registration period indicated thereon.
- RHC 4.5 Report of Change.**
 - 4.5.1 The registrant shall notify the Agency within ten (10) days after any change which renders the information on the initial registration no longer accurate.

RHC 4.6 Renewal of Registration.

4.6.1 The owner or person having possession of any registered particle accelerator shall re-register such particle accelerator with the Agency every two years as long as the activity requiring such registration continues.

RHC 4.7 Advertisement Prohibited.

4.7.1 No person, in any advertisement, shall refer to the fact that a particle accelerator is registered with the Agency and no person shall state or imply that any activity under such registration has been approved by the Agency.

RHC 4.8 Applicability.

4.8.1 The registrant shall be subject to all applicable requirements of these regulations.

RHC 4.9 Alternate Registration.

4.9.1 Instead of registering particle accelerators as provided in RHC 4.2, the owner or person having possession of particle accelerators may elect to register the accelerator facility. The registration of such a facility may be accomplished by a letter to the Agency stating:

4.9.1.1 Name, address and telephone number of the owner or person having administrative control over the accelerator facility.

4.9.1.2 Name, address (if different than that shown in 4.9.1) and discipline of the individual in charge of radiation protection.

4.9.1.3 The address of the accelerator facility.

4.9.1.4 The maximum power capability of the largest single particle accelerator.

4.9.1.5 The type of operation, i.e. Research, Development, or Commercial Production.

4.9.1.6 The date of application and signature of the registrant.

RHC 4.10 Carriers. Common and contract carriers operating within this State are exempt from this part to the extent that they transport or store particle accelerators in the regular course of their carriage for another or storage incident thereto.

RHC 4.11 U. S. Atomic Energy Commission Contractors. Any U. S. Atomic Energy Commission contractor or subcontractor of

the following categories operating within this State is exempt from this part to the extent that such contractor or subcontractor under his contract receives, possesses, uses, transfers, owns or acquires particle accelerators:

4.11.1 Prime contractors performing work for the AEC at U. S. Government-owned or controlled sites;

4.11.2 Prime contractors performing research in, or development, manufacture, storage, testing or transportation of, atomic weapons or components thereof.

4.11.3 Prime contractors using or operating nuclear reactors or other nuclear devices in a U. S. Government-owned vehicle or vessel; and,

4.11.4 Any other prime contractor or subcontractor when the State and the AEC jointly determine (i) that, under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to the public health and safety and (ii) that, the exemption of such contractor or subcontractor is otherwise appropriate.

RHC 4.12 Other Exemptions. The following types of equipment are exempt from this part:

4.12.1 Domestic television receivers.

4.12.2 Other electrical equipment that produces radiation incidental to its operation for other purposes, providing the dose rate to the whole body at the point of nearest approach to such equipment when any external shielding is removed does not exceed 0.5 rem per year. The production testing or factory servicing of such equipment shall not be exempt.

4.12.3 Particle accelerators while in transit or storage incident thereto.