

NEBRASKA DEPARTMENT OF HEALTH AND HUMAN SERVICES  
NOTICE OF PUBLIC HEARING

December 9, 2019  
1:00 p.m. Central Time  
Nebraska State Office Building – Lower Level B  
301 Centennial Mall South, Lincoln, Nebraska

The purpose of this hearing is to receive comments on proposed changes to Title 180, Chapter 9 of the Nebraska Administrative Code (NAC) – *Radiation Safety Requirements for Non-Human Use Particle Accelerators*. The chapter outline the safety requirements for persons who receive, posses, use transfer, own, or acquire any radiation generating equipment or any naturally occurring or accelerator produced radioactive material including special nuclear mater in quantities not sufficient to form a critical mass. The proposed changes remove duplicative statutory language from the regulation; remove any unnecessary language from the regulations; and update formatting.

Authority for these regulations is found in Neb. Rev. Stat. § 81-3117(7).

Interested persons may attend the hearing and provide verbal or written comments or mail, fax or email written comments, no later than the day of the hearing to: DHHS Legal Services, PO Box 95026, Lincoln, NE 68509-5026, (402) 742-2382 or [dhhs.regulations@nebraska.gov](mailto:dhhs.regulations@nebraska.gov), respectively.

A copy of the proposed changes is available online at <http://www.sos.ne.gov>, or by contacting DHHS at the mailing address or email above, or by phone at (402) 471-8417. The fiscal impact statement for these proposed changes may be obtained at the office of the Secretary of State, Regulations Division, 1201 N Street, Suite 120, Lincoln, NE 68508, or by calling (402) 471-2385.

Auxiliary aids or reasonable accommodations needed to participate in a hearing can be requested by calling (402) 471-8417. Individuals with hearing impairments may call DHHS at (402) 471-9570 (voice and TDD) or the Nebraska Relay System at 711 or (800) 833-7352 TDD at least 2 weeks prior to the hearing.

## FISCAL IMPACT STATEMENT

Agency: <b>Department of Health and Human Services</b>	
Title: 180	Prepared by: Julia Schmitt
Chapter: 9	Date prepared: 5/6/2019
Subject: Radiation Safety Requirements for Nonhuman Use Particle Accelerators	Telephone: 402-471-0528

Type of Fiscal Impact:

	State Agency	Political Sub.	Regulated Public
No Fiscal Impact	( <input checked="" type="checkbox"/> )	( <input checked="" type="checkbox"/> )	( <input checked="" type="checkbox"/> )
Increased Costs	( <input type="checkbox"/> )	( <input type="checkbox"/> )	( <input type="checkbox"/> )
Decreased Costs	( <input type="checkbox"/> )	( <input type="checkbox"/> )	( <input type="checkbox"/> )
Increased Revenue	( <input type="checkbox"/> )	( <input type="checkbox"/> )	( <input type="checkbox"/> )
Decreased Revenue	( <input type="checkbox"/> )	( <input type="checkbox"/> )	( <input type="checkbox"/> )
Indeterminable	( <input type="checkbox"/> )	( <input type="checkbox"/> )	( <input type="checkbox"/> )

Provide an Estimated Cost & Description of Impact:

State Agency:

Political Subdivision:

Regulated Public:

If indeterminable, explain why:

# PROPOSED REGULATION QUESTIONNAIRE

## Title 180 NAC 9

### 1) Is the regulation essential to the health, safety, or welfare of Nebraskans?

Yes. The purpose of the regulations are to institute and maintain a program to permit development and utilization of sources of radiation for peaceful purposes consistent with the protection of occupational and public health and safety and the environment. Regulated entities are using particle accelerator equipment to accelerate subatomic particles to very high energies. The accelerator produces a beam of charged particles that can be used in research or to produce radioactive material. As such, it is important that the accelerator is used in a manner that protects the user, the public and the environment.

### 2) Do the costs of the regulation outweigh the benefits? Provide specific data and reasoning.

Radioactive materials provide benefits to the public in a number of medical and industrial settings. Misuse of radioactive materials and ionizing radiation can be life-threatening and have catastrophic environmental consequences. The regulations provide safeguards that allow the benefits while minimizing risks. Without regulation by the state, individuals would be required to meet the same standards under federal licensure at significantly great cost to the licensees. As an Agreement State, the Annual Fees levied by Nebraska for licensure and regulation are much less than those levied by the U.S. Nuclear Regulatory Commission (NRC).

Examples:

Material Type	NRC	Nebraska
Medical Use	\$11,100 – 18,500	\$3,900
Panoramic Irradiator	\$62,000	\$11,500
Irradiator, self-shielded	\$6,500	\$2,600
Broad Scope (Educational or Medical)	\$29,700	\$18,000
Industrial Radiography	\$10,600	\$6,500

### 3) Does a process exist to measure the effectiveness of the regulation? If so, explain.

Yes. Licensees and registrants are inspected for compliance with the radiation safety regulations. The performance of the Office of Radiological Health is evaluated by the Nuclear Regulatory Commission during the Integrated Materials Performance Evaluation Program (IMPEP). Performance is assessed in the following areas: technical staffing and training; status of materials inspection program; technical quality of inspections; technical quality of licensing actions; technical quality of incident and allegation activities, and; compatibility of regulations.

### 4) Has a less restrictive alternative been considered?

The least restrictive alternative has been chosen. Because the Agreement requires that Nebraska's regulatory program be compatible with that of the NRC, rather than always identical, there are some areas of the regulations that we are allowed more flexibility in crafting regulations that more directly

meet the needs of our licensees while still being protective. Each regulation of the NRC is assigned a compatibility designation. Compatibility A regulations are basic radiation protection standard or related definitions, signs, labels or terms necessary for a common understanding of radiation protection principles. The State regulations must be essentially identical to those of the NRC. Compatibility B regulations have significant direct trans-boundary implications. The State regulations must be essentially identical to those of the NRC. For Compatibility C regulations, the essential objectives must be adopted by the State to avoid conflicts, duplications or gaps. The manner in which the essential objectives are addressed need not be the same as NRC, provided the essential objectives are met. For any Compatibility C regulations, the least restrictive regulatory alternative has been chosen.

**5) Was the regulation solely promulgated due a state statutory requirement? If so, provide citations.**

Yes, Neb. Rev. Stat. § 71-3505 (1) and § 71-3507 (1) require regulations. However, even if the statute were to be changed to “may”, regulations would be needed to ensure public safety and safe radiation use by the regulated entities.

**6) Was the regulation promulgated as the result of a federal mandate? If so, include copies of the applicable federal statutes and regulations.**

No. However, Section 274 of the Atomic Energy Act provides a statutory basis under which the U. S. Nuclear Regulatory Commission (NRC) relinquishes to the States portions of its regulatory authority to license and regulate byproduct materials (radioisotopes); source materials (uranium and thorium); and certain quantities of special nuclear materials to States that meet certain requirements. The mechanism for the transfer of NRC's authority to a State is an agreement signed by the Governor of the State and the Chairman of the Commission, in accordance with section 274b of the Act. The NRC relinquished their authority to the State of Nebraska in 1966 when Governor Morrison signed the Agreement with the NRC. The Agreement requires that Nebraska maintain a regulatory program that is adequate to protect public health and safety and the environment and that our regulations be compatible with those of the NRC. The NRC periodically reviews the program for adequacy and compatibility with that of the NRC. As an Agreement State, if the Nebraska Regulations for Control of Radiation are not found to be compatible, the NRC can terminate the Agreement and resume regulatory authority over radioactive materials within the State. Currently, there are 38 states that have agreements with the NRC with several more states in process.

# PROPOSED REGULATION POLICY PRE-REVIEW CHECKLIST

**Agency:** DHHS – Division of Public Health  
**Title, Chapter of Regulation:** Title 180 NAC 9  
**Subject:** Control of Radiation – General Provisions  
**Prepared by:** Julia Schmitt  
**Telephone:** 401-471-0528

## A. Policy Changes and Impacts

1. What does the regulation do and whom does it impact? Provide a brief description of the proposed rule or regulation and its impacts on state agencies, political subdivisions, and regulated persons or entities.

This revision re-promulgates Title 180 NAC 9 to remove any unnecessary language and any repeated statutory language from the regulations. The revisions also update formatting.

The regulations apply all persons who receive, possess, use transfer, own or acquired: (1) any radiation generating equipment; (2) any naturally occurring or accelerator produced radioactive material; including special nuclear mater in quantities not sufficient to form a critical mass. These parties will not be effected by reformatting.

2. Describe changes being proposed to current policy and briefly provide rationale.

No change in policy.

## B. Why is the rule necessary? Explain and provide an identification of authorizing statute(s) or legislative bill(s).

1. Update of regulation (repeal of obsolete statutes, reflect current policy, editing or technical language changes, etc.)

This revision re-promulgates Title 180 NAC 9 to update formatting, and to remove any unnecessary language or any repeated statutory language from the regulations.

2. Annual changes – cost of living, hunting season schedules, etc.

No.

3. Law was changed – federal \_\_\_\_ or state \_\_\_\_ [Cite authorizing statute(s) or legislative bill(s)] N/A
4. Extension of established policy or program, new initiatives or changes in policy (within statutory authority) No
5. Constituent initiated No
6. Financial needs – increases/decreases in fees No
7. Litigation requires changes in rules No
8. Addresses legal or constitutional concerns of Attorney General’s office No
9. Implements federal or court mandate No
10. Other (explain)

**C. What happens if these rules are not adopted?**

Unnecessary language or redundant regulations would remain in place.

**D. Policy Checklist**

1. Is this an update or editorial change reflecting essentially no change in policy? Yes
2. Does the policy in the proposed regulation reflect legislative intent? Yes
3. Is the policy proposed in the regulation a state mandate on local government? No Is it funded? N/A
4. Is the policy proposed in the regulation a federal mandate on local government? No Is it funded? N/A

**E. Fiscal Impact. In addition to completing the required Fiscal Impact Statement (a copy must be attached to this document), the agency must address the following:**

No fiscal impact.

1. Will the proposed regulation reduce, increase, or have no change in resources – funds, personnel or FTE? No change.

2. Have initial contacts been made with citizens or organizations that may be impacted by the proposed regulation? **No, because the changes are formatting and editorial. We will solicit public comment before a public hearing.**
3. Does the proposed regulation impact another agency? **No** Explain the impact. **No impact.**
4. Will the proposed regulation reduce, increase, or have no change on reporting requirements of businesses?

**No Change**

5. What is the agency's best estimate of the additional or reduced spending? If there is none, please note. If receipt of federal funds is contingent upon approval of the proposed regulation, then indicate the amount and nature of the federal funds affected, and enclose laws or correspondence from federal officials substantiating the information.

**No change in spending.**

6. Include a description of the impact that the proposed regulation will have on the number of state employees and how the agency intends to address proposed increases or decreases in FTE.

**No Impact.**

**F. Unique problems or issues and recommendations.**

**No known problems or issues.**

**G. Who is expected to be affected, or to oppose or support the proposed regulation? Explain what initial informal contacts have been made with organizations or citizens who may be affected by the regulation prior to the public hearing.**

**No known supporters or opponents.**

**DHHS will solicit public comment on the proposed regulations before the public hearing.**

**H. Are these proposed rules a likely candidate for negotiated rulemaking? Explain. Has the process been completed? If so, explain how the issues were addressed.**

**No.**

TITLE 180            CONTROL OF RADIATION

CHAPTER 9            RADIATION SAFETY REQUIREMENTS FOR NON HUMAN USE  
PARTICLE ACCELERATORS

001. SCOPE AND AUTHORITY. This chapter establishes procedures for the registration and use of particle accelerators for nonhuman use. Title 180 is authorized by and implement the Nebraska Radiation Control Act, Nebraska Revised Statute (Neb. Rev. Stat.) §§ 71-3501 to 71-3520. In addition to the requirements of this chapter, all registrants are subject to the requirements of 180 Nebraska Administrative Code (NAC) 1, 2, 4, 10, 15, and 18. Registrants whose operations result in the production of radioactive material must also meet the requirements of 180 NAC 3.

002. REGISTRATION REQUIREMENTS. Any person intending to receive, possess, use, transfer, own, or acquire a particle accelerator must have a registration which permits that activity.

003. GENERAL REQUIREMENTS. In addition to the requirements of 180 NAC 2 an registrant must:

- (A) Appoint a radiation safety officer;
- (B) Establish a radiation safety committee to approve, in advance, proposals for use of a particle accelerator. The radiation safety committee, consisting of at least three members, must oversee the use of the particle accelerator, and review the registrant's radiation safety program. Membership of the committee must include at least an authorized user, a representative of the registrant's management, and the Radiation Safety Officer;
- (C) Have proposed or existing equipment, facilities, and operating and emergency procedures adequate to protect health and minimize danger to public health and safety or property as required by 180 NAC 9-004 through 009;
- (D) Be qualified by training and experience to use the accelerator in question for the purpose requested as specified in this chapter, 180 NAC 4, and 180 NAC 10 in a manner as to minimize danger to public health and safety or property;
- (E) Ensure operation of the particle accelerator will not be harmful to the health and safety of the public; and
- (F) Ensure that the applicant, or the applicant's staff, or both, has training and experience in the use of particle accelerators as specified in 180 NAC 15-010.

004. OPERATOR QUALIFICATIONS. A person intending to operate an accelerator must meet the training requirements of 180 NAC 15-010.

005. OPERATING REQUIREMENTS. This section addresses requirements for operation of particle accelerators.



005.01 OPERATOR REQUIREMENTS. No registrant may permit any individual to act as an operator of a particle accelerator until the individual has:

- (A) Been instructed in and demonstrated an understanding of radiation safety;
- (B) Received copies of, instruction in, and demonstrated an understanding of the requirements of this chapter and the applicable requirements of 180 NAC 4 and 180 NAC 10, pertinent registration conditions, and the registrant's operating and emergency procedures; and
- (C) Demonstrated competence to use the particle accelerator, related equipment, and survey instruments which will be used.

005.02 RADIATION SAFETY COMMITTEE. The radiation safety committee or the radiation safety officer must have the authority to terminate the operations at a particle accelerator facility if the action is necessary to minimize danger to public health and safety or property.

006. SHIELDING AND SAFETY DESIGN REQUIREMENTS. Particle accelerator facilities must meet shielding and design requirements as specified below.

006.01 DESIGN AND SURVEY. A radiological health physicist as specified in 180 NAC 15-004.02 must be consulted in the design of a particle accelerator installation and must perform a radiation survey when the accelerator is first capable of producing radiation. A copy of the survey results must be available to the Department for review.

006.02 PRIMARY AND SECONDARY BARRIERS. Each particle accelerator installation must be provided with primary and secondary barriers as are necessary to be in compliance with 180 NAC 4-005 and 013.

007. PARTICLE ACCELERATOR CONTROLS AND INTERLOCK SYSTEMS. Particle accelerator control and interlocks must meet the following requirements.

007.01 CONTROL CONSOLE. Instrumentation, readouts and controls on the particle accelerator control console must be clearly identified and easily discernible.

007.02 ENTRANCE. Each entrance into a target room or other high radiation area must be provided with a safety interlock(s) that shuts down the machine under conditions of barrier penetration.

007.03 MANUAL RESET. When a safety interlock system has been tripped, it must only be possible to resume operation of the accelerator by manually resetting controls at the position where the safety interlock has been tripped, and lastly at the main control console.

007.04 INDEPENDENT CIRCUIT. Each safety interlock must be on a circuit which must allow its operation independently of all other safety interlocks.

007.05 DESIGN. All safety interlocks must be designed so that any defect or component failure in the safety interlock system prevents operation of the accelerator.

007.06 CUTOFF SWITCH. A scram button or other emergency power cutoff switch must be located and easily identifiable in all high radiation areas. The cutoff switch must include a manual reset so that the accelerator cannot be restarted from the accelerator control console without resetting the cutoff switch.

008. WARNING DEVICES. Particle accelerators must be equipped with warning devices as required below.

008.01 LOCATION. Each location designated as a high radiation area, and each entrance to that location, must be equipped with easily observable warning lights that operate when, and only when, radiation is being produced.

008.02 AUDIBLE WARNING DEVICE. Each high radiation area must have an audible warning device which must be activated for 15 seconds prior to the possible creation of a high radiation area. The warning device must be clearly discernible in all high radiation areas and all radiation areas.

008.03 BARRIERS. Barriers, temporary or otherwise, and pathways leading to high radiation areas must be identified as required by 180 NAC 4-033.

009. SAFETY SYSTEMS. The safety systems described below must be in place.

009.01 UNAUTHORIZED USE. When not in operation, a particle accelerator must be secured to prevent unauthorized use.

009.02 SAFETY INTERLOCK SYSTEM. The safety interlock system must not be used to turn off the accelerator beam except in an emergency.

009.03 SAFETY AND WARNING DEVICES. All safety and warning devices, including interlocks, must be checked for proper operation at intervals not to exceed six months. Results of these checks must be maintained at the accelerator facility for inspection by the Department.

009.04 ELECTRICAL CIRCUIT DIAGRAMS. Electrical circuit diagrams of the accelerator and the associated interlock system must be kept current and maintained for inspection by the Department and must be available to the operator at each accelerator facility.

009.05 SAFETY INTERLOCK BYPASS. If it is necessary to intentionally bypass a safety interlock, the action must be:

- (A) Authorized by the radiation safety committee, radiation safety officer, or both;
- (B) Recorded in a permanent log and a notice posted at the accelerator control console,  
and;
- (C) Terminated as soon as possible.

009.06 OPERATING AND EMERGENCY PROCEDURES. A copy of the current operating and emergency procedures must be maintained at the accelerator control panel.

010. RADIATION MONITORING REQUIREMENTS. Radiation must be monitored as described below.

010.01 MONITORING EQUIPEMENT. There must be available at each particle accelerator facility appropriate portable monitoring equipment that is operable and has been appropriately calibrated for the radiation being produced at the facility. The equipment must be tested for proper operation daily and calibrated at intervals not to exceed one year and after each servicing and repair.

010.02 RADIATION PROTECTION SURVEY. A radiation protection survey must be performed and documented by a radiological health physicist as set out in 180 NAC 15-004.02 when changes have been made in shielding, operation, equipment, or occupancy of adjacent areas.

010.03 RADIATION LEVELS. Radiation levels in all high radiation areas must be continuously monitored. The monitoring devices must be electronically independent of the accelerator control and safety interlock systems and capable of providing a readout at the control panel.

010.04 AREA MONITORS. All area monitors must be calibrated at intervals not to exceed one year and after each servicing and repair.

010.05 PERIODIC AIR SURVEYS. Whenever applicable, periodic surveys must be made to determine the amount of airborne particulate radioactivity present.

010.06 PERIODIC SMEAR SURVEYS. Whenever applicable, periodic smear surveys must be made to determine the degree of contamination.

010.07 WRITTEN PROCEDURES FOR SURVEYS. All surveys must be made following the written procedures established by a radiological health physicist as set out in 15-004.02 or by the radiation safety officer.

010.08 RECORDS. Records of all radiation protection surveys, calibration and instrumentation tests must be maintained at the accelerator facility for inspection by the Department.

011. VENTILATION SYSTEMS. Ventilation systems must control airborne radioactive material.

011.01 AIRBORNE RADIOACTIVE MATERIAL. Ventilation systems must be provided to ensure that personnel entering any area where airborne radioactivity may be produced will not be exposed to airborne radioactive material in excess of the limits specified in 180 NAC 4, Appendix 4-B, Table I.

DRAFT  
06-10-2019

NEBRASKA DEPARTMENT OF  
HEALTH AND HUMAN SERVICES

180 NAC 9

011.02 RELEASES. A registrant, as required by 180 NAC 4-014, must not vent, release or otherwise discharge airborne radioactive material to an unrestricted area which exceed the limits specified in 180 NAC 4, Appendix 4-B, Table II, except as authorized in 180 NAC 4-014 or 040. For purposes of 180 NAC 9-011, concentrations may be averaged over a period of not greater than one year. Every reasonable effort should be made to maintain releases of radioactive material to unrestricted areas as far below these limits as is reasonably achievable.

TITLE 180 — CONTROL OF RADIATION

CHAPTER 9 — RADIATION SAFETY REQUIREMENTS FOR NON HUMAN USE PARTICLE  
ACCELERATORS

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EFFECTIVE DATE \_\_\_\_\_ NEBRASKA DEPARTMENT OF  
JULY 11, 2009 \_\_\_\_\_ HEALTH AND HUMAN SERVICES \_\_\_\_\_ 180 NAC 9

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EFFECTIVE DATE  
JULY 11, 2009

NEBRASKA DEPARTMENT OF  
HEALTH AND HUMAN SERVICES

180 NAC 9

~~TITLE 180 — CONTROL OF RADIATION~~

~~CHAPTER 9 — RADIATION SAFETY REQUIREMENTS FOR NONHUMAN USE PARTICLE  
ACCELERATORS~~

~~9-001 — SCOPE AND AUTHORITY:~~

~~9-001.01 — 180 NAC 9 establishes procedures for the registration and use of particle accelerators for nonhuman use. The regulations are authorized by and implement the Nebraska Radiation Control Act, Neb. Stat. Rev. §§ 71-3501 to 71-3520.~~

~~9-001.02 — In addition to the requirements of 180 NAC 9, all registrants are subject to the requirements of 180 NAC 1, 2, 4, 10, 15, 17 and 18. Registrants engaged in industrial radiographic operations are subject to the requirements of 180 NAC 5. Registrants whose operations result in the production of radioactive material are subject to the requirements of 180 NAC 3.~~

**REGISTRATION PROCEDURE** Removed

~~9-002 — REGISTRATION REQUIREMENTS: — Any person intending to receive, possess, use, transfer, own, or acquire a particle accelerator must be authorized in a registration issued pursuant to 180 NAC 2.~~

~~9-003 — GENERAL OPERATING REQUIREMENTS FOR THE ISSUANCE OF A REGISTRATION FOR PARTICLE ACCELERATORS: — In addition to the requirements of 180 NAC 2, registration application for use of a particle accelerator will be approved only if the Department determines that:~~

- ~~1. — The applicant has appointed a radiation safety officer;~~
- ~~2. — The applicant has established a radiation safety committee to approve in advance, proposals for use of a particle accelerator(s). The radiation safety committee of at least three members will oversee the use of the particle accelerator, and review the institution's radiation safety program. Membership of the committee should include at least the following: an authorized user, a representative of the institution's management and the Radiation Safety Officer;~~
- ~~3. — The applicant's proposed or existing equipment, facilities and operating and emergency procedures are adequate to protect health and minimize danger to public health and safety or property as required in 180 NAC 9-004 through 9-009;~~

- ~~4. The applicant is qualified by reason of training and experience to use the accelerator in question for the purpose requested in accordance with 180 NAC 9 and 180 NAC 4 and 10 in such a manner as to minimize danger to public health and safety or property.~~
- ~~5. The issuance of the registration will not be inimical to the health and safety of the public, and~~
- ~~6. The applicant and/or the applicant's staff has training and experience in the use of particle accelerators as specified in 180 NAC 15-025.~~

#### ~~RADIATION SAFETY REQUIREMENTS FOR THE USE OF PARTICLE ACCELERATORS~~

~~9-004 OPERATOR QUALIFICATIONS: Any person intending to operate an accelerator must meet the training requirements of 180 NAC 15-025 (non-human use accelerators).~~

#### ~~9-005 LIMITATIONS~~

- ~~1. No registrant must permit any individual to act as an operator of a particle accelerator until such individual:
  - ~~a. Has been instructed in radiation safety and must have demonstrated an understanding thereof;~~
  - ~~b. Has received copies of and instruction in 180 NAC 9 and the applicable requirements of 180 NAC 4 and 10, pertinent registration conditions and the registrant's operating and emergency procedures, and must have demonstrated understanding thereof; and~~
  - ~~c. Has demonstrated competence to use the particle accelerator, related equipment, and survey instruments which will be employed.~~~~
- ~~2. The radiation safety committee or the radiation safety officer must have the authority to terminate the operations at a particle accelerator facility if such action is deemed necessary to minimize danger to public health and safety or property.~~

#### ~~9-006 SHIELDING AND SAFETY DESIGN REQUIREMENTS~~

~~9-006.01 A radiological health physicist as specified in 180 NAC 15-013.02 must be consulted in the design of a particle accelerator installation, must submit a plan review prior to construction and must perform a radiation survey when the accelerator is first capable of producing radiation. A copy of the survey results must be submitted to the Department for review.~~

~~9-006.02 Each particle accelerator installation must be provided with such primary and/or secondary barriers as are necessary to assure compliance with 180 NAC 4-005 and 4-013.~~

#### ~~9-007 PARTICLE ACCELERATOR CONTROLS AND INTERLOCK SYSTEMS~~

~~9-007.01 Instrumentation, readouts and controls on the particle accelerator control console must be clearly identified and easily discernible.~~



~~9-007.02~~ Each entrance into a target room or other high radiation area must be provided with a safety interlock(s) that shuts down the machine under conditions of barrier penetration.

~~9-007.03~~ When a safety interlock system has been tripped, it must only be possible to resume operation of the accelerator by manually resetting controls at the position where the safety interlock has been tripped, and lastly at the main control console.

~~9-007.04~~ Each safety interlock must be on a circuit which must allow its operation independently of all other safety interlocks.

~~9-007.05~~ All safety interlocks must be designed so that any defect or component failure in the safety interlock system prevents operation of the accelerator.

~~9-007.06~~ A scram button or other emergency power cutoff switch must be located and easily identifiable in all high radiation areas. The cutoff switch must include a manual reset so that the accelerator cannot be restarted from the accelerator control console without resetting the cutoff switch.

#### 9-008 WARNING DEVICES

~~9-008.01~~ Each location designated as a high radiation area, and each entrance to such location, must be equipped with easily observable warning lights that operate when, and only when, radiation is being produced.

~~9-008.02~~ Each high radiation area must have an audible warning device which must be activated for 15 seconds prior to the possible creation of such high radiation area. Such warning device must be clearly discernible in all high radiation areas and all radiation areas.

~~9-008.03~~ Barriers, temporary or otherwise, and pathways leading to high radiation areas must be identified in accordance with 180 NAC 4-033.

#### 9-009 OPERATING PROCEDURES

~~9-009.01~~ Particle accelerators, when not in operation, must be secured to prevent unauthorized use.

~~9-009.02~~ The safety interlock system must not be used to turn off the accelerator beam except in an emergency.

~~9-009.03~~ All safety and warning devices, including interlocks, must be checked for proper operation at intervals not to exceed six months. Results of such tests must be maintained at the accelerator facility for inspection by the Department.

~~9-009.04~~ Electrical circuit diagrams of the accelerator and the associated interlock system must be kept current and maintained for inspection by the Department and must be available to the operator at each accelerator facility.

~~9-009.05~~ If, for any reason, it is necessary to intentionally bypass a safety interlock or interlocks, such action must be:

- ~~1.~~ Authorized by the radiation safety committee and/or radiation safety officer;
- ~~2.~~ Recorded in a permanent log and a notice posted at the accelerator control console; and
- ~~3.~~ Terminated as soon as possible.

~~9-009.06~~ A copy of the current operating and emergency procedures must be maintained at the accelerator control panel.

#### 9-010 RADIATION MONITORING REQUIREMENTS

~~9-010.01~~ There must be available at each particle accelerator facility appropriate portable monitoring equipment which is operable and has been appropriately calibrated, for the radiation being produced at the facility. The equipment must be tested for proper operation daily and calibrated at intervals not to exceed one year and after each servicing and repair.

~~9-010.02~~ A radiation protection survey must be performed, and documented by a radiological health physicist as specified in 180 NAC 15-013.02, when changes have been made in shielding, operation, equipment, or occupancy of adjacent areas.

~~9-010.03~~ Radiation levels in all high radiation areas must be continuously monitored. The monitoring devices must be electronically independent of the accelerator control and safety interlock systems and capable of providing a readout at the control panel.

~~9-010.04~~ All area monitors must be calibrated at intervals not to exceed one year and after each servicing and repair.

~~9-010.05~~ Whenever applicable, periodic surveys must be made to determine the amount of airborne particulate radioactivity present.

~~9-010.06~~ Whenever applicable, periodic smear surveys must be made to determine the degree of contamination.

~~9-010.07~~ All surveys must be made in accordance with the written procedures established by a radiological health physicist as specified in 15-013.02, or the radiation safety officer.

~~9-010.08~~ Records of all radiation protection surveys, calibration and instrumentation tests, must be maintained at the accelerator facility for inspection by the Department.

#### 9-011 VENTILATION SYSTEMS

EFFECTIVE DATE  
JULY 11, 2009

NEBRASKA DEPARTMENT OF  
HEALTH AND HUMAN SERVICES

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~~9-011.01 Ventilation systems must be provided to ensure that personnel entering any area where airborne radioactivity may be produced will not be exposed to airborne radioactive material in excess of those limits specified in 180 NAC 4, Appendix 4-B, Table I.~~

~~9-011.02 A registrant, as required by 180 NAC 4-014, must not vent, release or otherwise discharge airborne radioactive material to an unrestricted area which exceed the limits specified in 180 NAC 4, Appendix 4-B, Table II, except as authorized pursuant to 180 NAC 4-014 or 4-040. For purposes of 180 NAC 9-011.02, concentrations may be averaged over a period of not greater than one year. Every reasonable effort should be made to maintain releases of radioactive material to unrestricted areas as far below these limits as is reasonably achievable.~~

