



COLORADO

Department of Public
Health & Environment

To: Members of the State Board of Health

From: James H. Grice, Radiation Program Manager, Hazardous Materials and Waste Management Division
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Through: Tracie M. White, Division Director *TMW*

Date: August 21, 2024

Subject: Request for a Rulemaking Hearing concerning 6 CCR 1007-1 Part 9, Radiation control - Radiation safety requirements for particle accelerators not used in the healing arts.

The Division is proposing minor changes to radiation machine regulation Part 9 which governs the use of particle accelerators that are not used in the healing arts. The proposed changes will clarify existing provisions for consistency with language in the model regulation Part I of the Conference of Radiation Control Directors, (CRCPD) Inc., update the provisions for documents that are incorporated by reference consistent with the state Administrative Procedure Act, and make minor editorial and technical corrections.

We received no comments from stakeholders during our comment period in June-July 2024. Stakeholders for this rule include those using particle accelerators for non-medical purposes in a variety of industries including high tech, manufacturing, research and other fields.

Prior to the stakeholder process, our Radiation Advisory Committee reviewed and discussed the proposed rule changes and concurred with moving the rule forward as proposed and with no specific concerns regarding the proposed changes.

Although the proposed rule changes affect only select areas of the rule, due to its short length, the rule is being amended in its entirety. Throughout the proposed draft rule, new text appears as red bold text while deleted language shows as strikethrough text.

The Radiation Program respectfully requests that the Board of Health set a rulemaking hearing for October 16, 2024 for this rule.

**STATEMENT OF BASIS AND PURPOSE
AND SPECIFIC STATUTORY AUTHORITY**

for Amendments to 6 CCR 1007-1, Part 09, Radiation control -
Radiation safety requirements for particle accelerators not used in the healing arts

Basis and Purpose.

Part 9

Part 9 contains specific requirements applicable to particle accelerators (a type of radiation producing machine) that are not used for healing arts (medical) purposes. Particle accelerators may be used in a variety of industries and fields for different purposes including preparation and manufacturing of microchips, radiation hardening testing on electronics used for space and military applications, devices used for oil and gas exploration, in research, and for production of radioactive materials.

The overall intent of this rule amendment is to make minor editorial and technical corrections, add clarity to existing requirements, update the incorporation by reference section, and improve the consistency between Part 9 and the national model rule Part I of the Conference of Radiation Control Program Directors, (CRCPD) Inc.

Summary of Part 9 changes by section

Changes to the rule header information

- The rulemaking adoption and effective date is added to the rule, consistent with current practice and other radiation control regulations. This information helps to quickly identify when a given rule became effective.

Changes to Section 9.1.4.2(2)

- The rule is amended to correct a cross-reference error. The current rule references Part 20, but due to past rule renumbering, this should instead reference Part 24. Part 24 contains the requirements specific to healing arts (medical) use of particle accelerators. Language is added to clarify that the reference to and requirements of Part 24 are for particle accelerators and not other types of x-ray devices or radiation producing machines;

Changes to Section 9.1.5

- Consistent with other recent radiation control rulemakings, standardized language pertaining to published material incorporated by reference is added. The change identifies where documents incorporated by reference can be located in order better meet the intent and requirements of the Colorado Administrative Procedure Act;

Changes to Section 9.3.2.4

- To improve clarity and understanding, this section and subsequent sections of the rule are amended to add the word “Part” where the rule makes reference to other radiation regulations;

Changes to Section 9.3.2.6

- This section is revised to add clarifying language to require use of written procedures when a radiation safety committee has not been established to approve deviations from standard machine uses. Smaller facilities may not have or be capable of having a

radiation safety committee. The intent of this proposed change is to ensure proper oversight of any unique uses by the facility radiation safety officer;

Changes to Section 9.3.3

- Language is amended to enhance the clarity of this provision to address particle accelerator facilities where radioactive materials are also in use. This coordination is needed to ensure proper radiation controls are in place to address both radioactive materials and radiation machine (accelerator) hazards and requirements;

Changes to Section 9.5.2

- Although it is typically standard practice for the radiation safety officer to have stop work authority at facilities using sources of radiation, new provision 9.5.2 is added to strengthen and clarify their authority to terminate operations if necessary to minimize danger and protect public health and safety. The added language is consistent with the CRCPD Part I model rule (1991);

Changes to Section 9.7.5

- Section 9.7.5 is revised to incorporate additional language from the CRCPD Part I model rule, which is more specific than the current requirement with regard to resetting the accelerator when a safety interlock system has been tripped. Different particle accelerators will have different safety interlocks and designs. The added language is consistent with the CRCPD Part I model rule (1991);

Changes to Section 9.9.3.1

- Here and in subsequent sections as applicable, the numerical value is added in parenthesis where a numerical value is expressed as a text value; and

Changes to Section 9.10.2

- Here, the phrase “acceptable to” is replaced by “registered with” as it pertains to Qualified Experts who are involved in performing radiation safety measurements at a particle accelerator facility. The revised language is more consistent with language used in other radiation control regulations.

Specific Statutory Authority.

Statutes that require or authorize rulemaking:

25-1.5-101(1)(k), 25-1.5-101(1)(l), 25-11-103, 25-11-104, and 25-1-108, C.R.S.

Is this rulemaking due to a change in state statute?

_____ Yes, the bill number is _____. Rules are ____ authorized ____ required.

XX No

Does this rulemaking include proposed rule language that incorporate materials by reference?

XX Yes

XX URL

_____ No

Does this rulemaking include proposed rule language to create or modify fines or fees?

_____ Yes

XX No

Does the proposed rule language create (or increase) a state mandate on local government?

XX No.

- The proposed rule does not require a local government to perform or increase a specific activity for which the local government will not be reimbursed;
- The proposed rule requires a local government to perform or increase a specific activity because the local government has opted to perform an activity, or;
- The proposed rule reduces or eliminates a state mandate on local government.

Has an elected official or other representatives of local governments disagreed with this categorization of the mandate? ____Yes XNo. If “yes,” please explain why there is disagreement in the categorization.

Please elaborate as to why a rule that contains a state mandate on local government is necessary.

For consistency with the model rules and national framework for regulation of sources of radiation, all facilities regardless of ownership, must adhere to the same or equally protective public health and safety requirements and regulations for possession and use of radiation sources in Colorado. The proposed rule changes result in requirements that will equally impact all types of persons who may possess, or operate non-healing arts particle accelerators and facilities whether private, or governmentally owned or operated.

REGULATORY ANALYSIS

6 CCR 1007-1, Part 09, Radiation control -

Radiation safety requirements for particle accelerators not used in the healing arts

1. A description of the classes of persons affected by the proposed rule, including the classes that will bear the costs and the classes that will benefit from the proposed rule.

Group of persons/entities affected by the Proposed Rule changes	Size of the Group	Relationship to the Proposed Rule Select category: C/CLG/S/B
Registered facilities that use particle accelerators for non-healing arts purposes.	Approximately 6	C
Registered Qualified Inspectors (QIs) and Qualified Experts (QEs) who may perform radiation safety related and inspection services for or at registered facilities who use non-healing arts particle accelerators.	Approximately 200	C
Other stakeholders and interested parties. This includes individuals or entities who requested notification of proposed x-ray/radiation producing machine related radiation rule changes for industrial purposes and general radiation program updates. This includes private organizations, professional societies, and companies. Individuals on these lists may also be employed at registered x-ray facilities.	Approximately 1100	S

While all are stakeholders, groups of persons/entities connect to the rule and the problem being solved by the rule in different ways. To better understand those different relationships, the following relationship categorization key is used:

- C = individuals/entities that implement or apply the rule.
- CLG = local governments that must implement the rule in order to remain in compliance with the law.
- S = individuals/entities that do not implement or apply the rule but are interested in others applying the rule.
- B = the individuals that are ultimately served, including the customers of our customers. These individuals may benefit, be harmed by or be at-risk because of the standard communicated in the rule or the manner in which the rule is implemented.

More than one category may be appropriate for some stakeholders.

2. To the extent practicable, a description of the probable quantitative and qualitative impact of the proposed rule, economic or otherwise, upon affected classes of persons.

Economic outcomes

Summarize the financial costs and benefits, include a description of costs that must be incurred, costs that may be incurred, any Department measures taken to reduce or eliminate these costs, and any financial benefits.

Financial/economic costs:

C and CLG:

There are no expected financial/economic costs for the proposed changes to Part 9, as changes consist of language clarifications and updates of current requirements and processes.

Financial/economic benefits:

There are no expected financial/economic benefits for the proposed changes to Part 9, as changes consist of language clarifications and updates to current requirements.

Please describe any anticipated financial costs or benefits to these individuals/entities.

S: No impacts.

B: No impacts.

Non-economic outcomes

Summarize the anticipated favorable and non-favorable non-economic outcomes (short-term and long-term), and, if known, the likelihood of the outcomes for each affected class of persons by the relationship category.

C/CLG: The overall anticipated favorable outcome for the proposed changes to the Part 9 rule, will be improved clarity and understanding of the regulations and requirements by the regulated community and radiation program staff.

The remaining proposed changes are primarily technical and clarification changes and not expected to have any direct or indirect impact or outcomes for the end user.

3. The probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues.

A. Anticipated CDPHE personal services, operating costs or other expenditures:
No impacts.

Anticipated CDPHE Revenues:

No impacts to CDPHE revenues.

B. Anticipated personal services, operating costs or other expenditures by another state agency: Not Applicable

Anticipated Revenues for another state agency: Not Applicable

4. **A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction.**

Along with the costs and benefits discussed above, the proposed revisions:

- ☒ _X_ Comply with a statutory mandate to promulgate rules.
- ☒ _X_ Comply with federal or state statutory mandates, federal or state regulations, and Department funding obligations.
- ☒ _X_ Maintain alignment with other states or national standards.
- ☒ _X_ Implement a Regulatory Efficiency Review (rule review) result
- ☒ _X_ Improve public and environmental health practice.
- ☐ ___ Implement stakeholder feedback.

Advance the following CDPHE Strategic Plan priorities (select all that apply):

Goal 1, Implement public health and environmental priorities

Goal 2, Increase Efficiency, Effectiveness and Elegance

Goal 3, Improve Employee Engagement

Goal 4, Promote health equity and environmental justice

Goal 5, Prepare and respond to emerging issues, and

Comply with statutory mandates and funding obligations

Strategies to support these goals:

- ☐ ___ Substance Abuse (Goal 1)
- ☐ ___ Mental Health (Goal 1, 2, 3 and 4)
- ☐ ___ Obesity (Goal 1)
- ☐ ___ Immunization (Goal 1)
- ☐ ___ Air Quality (Goal 1)
- ☐ ___ Water Quality (Goal 1)
- ☐ ___ Data collection and dissemination (Goal 1, 2, 3, 4, 5)
- ☒ _X_ Implement quality improvement/a quality improvement project (Goal 1, 2, 3, 5)
- ☐ ___ Employee Engagement (Goal 1, 2, 3)
- ☐ ___ Decisions incorporate health equity and environmental justice (Goal 1, 3, 4)
- ☐ ___ Detect, prepare and respond to emerging issues (Goal 1, 2, 3, 4, 5)

___ Advance CDPHE Division-level strategic priorities.

The costs and benefits of the proposed rule will not be incurred if inaction was chosen. Costs and benefits of inaction not previously discussed include:

The cost of inaction by failing to implement the proposed changes will result in retaining some language that may be unclear or ambiguous or that may not be consistent with other radiation control regulations or national model regulations. Similarly, failing to update provisions pertaining to the incorporation by reference language will potentially make the rule incompatible with the Colorado Administrative Procedure Act requirements.

There are no benefits of inaction.

5. A determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the proposed rule.

Rulemaking is proposed when it is the least costly method or the only statutorily allowable method for achieving the purpose of the statute. The benefits, risks and costs of these proposed revisions were compared to the costs and benefits of other options. The proposed revisions provide the most benefit for the least amount of cost, are the minimum necessary or are the most feasible manner to achieve compliance.

6. Alternative Rules or Alternatives to Rulemaking Considered and Why Rejected.

There were no alternatives to this rulemaking considered, as the corrections, revisions and clarifications to the rule will help make it more consistent with existing national model regulations and are intended to add clarity and understanding to the rule.

Alternatives to the revised language regarding incorporating documents by reference were not considered as this change is necessary to meet requirements of the Colorado Administrative Procedure Act. Failure to incorporate this language may result in the rule being negated or invalidated by the legislature.

7. To the extent practicable, a quantification of the data used in the analysis; the analysis must take into account both short-term and long-term consequences.

The proposed changes did not require a data based evaluation or analysis. The proposed changes are minor technical changes that are expected to improve the implementation and understanding of the rule. The proposed updates pertaining to the documents incorporated by reference section are consistent with other recently amended radiation control rules and regulations.

STAKEHOLDER ENGAGEMENT

for Amendments to
6 CCR 1007-1, Part 09, Radiation control -
Radiation safety requirements for particle accelerators not used in the healing arts

State law requires agencies to establish a representative group of participants when considering to adopt or modify new and existing rules. This is commonly referred to as a stakeholder group.

Early Stakeholder Engagement:

The following individuals and/or entities were invited to provide input in the development of these proposed rules:

Organization	Representative Name and Title (if known)
All 475 industrial x-ray registrants in Colorado. Of these, a very limited number - approximately 6 facilities - use particle accelerators for non-healing arts (non-medical) purposes.	NA
Approximately 200 registered Qualified Inspectors and Qualified Experts who provide services to registered x-ray facilities.	NA
Approximately 1,125 other stakeholders with an interest in changes to rules and regulations pertaining to radiation control for x-ray devices used for industrial and research purposes, including private individuals and companies, professional societies, associations and related organizations. Some stakeholders may also be employed by registered x-ray facilities.	NA

On June 4, 2024, stakeholders in the above identified categories or groups were notified by email of the opportunity to comment on the proposed draft rules that were posted on the department website. The comment period ended on July 5, 2024 and no comments were received from registrants or other stakeholders.

Stakeholder Group Notification

The stakeholder group was provided notice of the rulemaking hearing and provided a copy of the proposed rules or the internet location where the rules may be viewed. Notice was provided prior to the date the notice of rulemaking was published in the Colorado Register (typically, the 10th of the month following the Request for Rulemaking).

☒ Not applicable. This is a Request for Rulemaking Packet. Notification will occur if the Board of Health sets this matter for rulemaking.

☐ Yes.

Summarize Major Factual and Policy Issues Encountered and the Stakeholder Feedback Received. If there is a lack of consensus regarding the proposed rule, please also identify the Department's efforts to address stakeholder feedback or why the Department was unable to accommodate the request.

During the stakeholder comment period, no comments were submitted by stakeholders.

Please identify the determinants of health or other health equity and environmental justice considerations, values or outcomes related to this rulemaking: None.

Overall, after considering the benefits, risks and costs, the proposed rule (select all that apply):

	Improves behavioral health and mental health; or, reduces substance abuse or suicide risk.		Reduces or eliminates health care costs, improves access to health care or the system of care; stabilizes individual participation; or, improves the quality of care for unserved or underserved populations.
	Improves housing, land use, neighborhoods, local infrastructure, community services, built environment, safe physical spaces or transportation.	X	Reduces occupational hazards; improves an individual's ability to secure or maintain employment; or, increases stability in an employer's workforce.
	Improves access to food and healthy food options.		Reduces exposure to toxins, pollutants, contaminants or hazardous substances; or ensures the safe application of radioactive material or chemicals.
X	Improves access to public and environmental health information; improves the readability of the rule; or, increases the shared understanding of roles and responsibilities, or what occurs under a rule.		Supports community partnerships; community planning efforts; community needs for data to inform decisions; community needs to evaluate the effectiveness of its efforts and outcomes.
	Increases a child's ability to participate in early education and educational opportunities through prevention efforts that increase protective factors and decrease risk factors, or stabilizes individual participation in the opportunity.		Considers the value of different lived experiences and the increased opportunity to be effective when services are culturally responsive.
	Monitors, diagnoses and investigates health problems, and health or environmental hazards in the community.		Ensures a competent public and environmental health workforce or health care workforce.

DRAFT 1 07/26/2024

DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Hazardous Materials and Waste Management Division

**RADIATION CONTROL - RADIATION SAFETY REQUIREMENTS FOR PARTICLE ACCELERATORS
NOT USED IN THE HEALING ARTS**

6 CCR 1007-1 Part 09

[Editor's Notes follow the text of the rules at the end of this CCR Document.]

Adopted by the Board of Health October 16, 2024, effective date December 15, 2024

**PART 9 RADIATION SAFETY REQUIREMENTS FOR PARTICLE ACCELERATORS NOT
USED IN THE HEALING ARTS**

9.1 Purpose and Scope.

9.1.1 Authority.

9.1.1.1 Rules and regulations set forth herein are adopted pursuant to the provisions of sections
25 1 108, 25-1.5-101(1)(I), and 25-11-104, CRS.

9.1.2 Basis and Purpose.

9.1.2.1 A statement of basis and purpose accompanies this part and changes to this part. A copy
may be obtained from the Department.

9.1.3 Scope.

9.1.3.1 This part establishes procedures for the registration and the use of particle accelerators
not used in the healing arts.

9.1.4 Applicability.

9.1.4.1 The requirements and provisions of Part 9 apply to each registrant or applicant for
registration subject to Part 9 unless specifically exempted from Part 9.

9.1.4.2 The provisions of this part are in addition to (and not in substitution for) other applicable
provisions of Part 1, 2, 4, 10 or other parts of these regulations.

(1) Registrants engaged in industrial radiographic operations are subject to the
applicable requirements of Part 5.

(2) Registrants engaged in **use of particle accelerators in** the healing arts are
subject to the requirements of Part **2024**.

(3) Registrants whose operations result in the production of radioactive material are
subject to the applicable requirements of Part 3.

9.1.5 Published Material Incorporated by Reference.

Commented [JJ1]: Editorial note 1: All comments (such as this one) shown in the right side margin of this draft document are for information purposes and are intended to assist the reader in understanding the purpose and intent of the proposed rule changes during the review and comment process. These side margin notes are **not** part of the rule and all comments will be deleted prior to publication of the final rule by the Colorado Secretary of State.

Editorial note 2: Alignment and formatting corrections and minor typographical adjustments may be made in the rule and may not be specifically identified with a side margin comment.

Editorial note 3: Colorado's radiation regulations are required to be compatible with the federal regulations of the U.S. Nuclear Regulatory Commission (NRC); and consistent with the current Suggested State Regulations for Control of Radiation (SSRCR's) model rules of the Conference of Radiation Control Program Director's (CRCPD), Inc. except where the Board of Health determines a deviation is necessary.

Part 9 is modeled after the CRCPD SSRCR [Part I model rule](#) although that rule has not been revised since 1991. There is no federal rule that parallels Part 9.

Editorial note 4: This draft is a complete rule, although some provisions may be unaffected or unchanged. If adopted, the rule will be a complete rule that is adopted in its entirety.

Commented [JJ2]: For consistency with the format and content of other radiation control regulations, the adoption and effective dates are added to this rule.

The stated adoption and effective dates are tentative and subject to change, pending the Board of Health meeting schedule, acceptance by the Board, final adoption by the Board, and the Colorado Register publication dates.

The anticipated dates are based on the annual rulemaking hearing schedule (regulatory agenda) for the Department which may be found [online](#).

Commented [JJ3]: Language in 9.1.4.2 is revised for clarity. Additionally, due to a prior rule renumbering, Part 20 is renumbered to Part 24.

Commented [JJ4]: For consistency with requirements of the Colorado Administrative Procedure Act, and other recently amended radiation control regulation, additional information and details are added to the section for materials incorporated by reference.

9.1.5.1 Published material incorporated in Part 9 by reference is available in accord with Part 1, Section 1.4.

9.1.5.1 Throughout this Part 9, federal regulations, state regulations, and standards or guidelines of outside organizations have been adopted and incorporated by reference. Unless a prior version of the incorporated material is otherwise specifically indicated, the materials incorporated by reference cited herein include only those versions that were in effect as of the most recent effective date of this Part 9 (August, 2024), and not later amendments or editions of the incorporated material.

9.1.5.2 Materials incorporated by reference are available for public inspection, and copies (including certified copies) can be obtained at reasonable cost, during normal business hours from the Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division, 4300 Cherry Creek Drive South, Denver, Colorado 80246. Additionally, <https://cdphe.colorado.gov/hm/radregs> identifies where the incorporated federal and state regulations are available to the public on the internet at no cost. A copy of the materials incorporated in this Part is available for public inspection at the state publications depository and distribution center.

9.1.5.3 Availability from Source Agencies or Organizations.

- (1) All state regulations incorporated by reference herein are available at no cost in the online edition of the Code of Colorado Regulations (CCR) hosted by the Colorado Secretary of State's Office, online at <https://www.sos.state.co.us/CCR/NumericalDeptList.do#1000>.

9.2 Definitions.

9.2.1 Definitions of general applicability to these regulations are in Part 1, section 1.2.

REGISTRATION PROCEDURE

9.3 Registration.

9.3.1 No person shall receive, possess, use, transfer, own, or acquire a particle accelerator except as authorized in a registration issued pursuant to Part 2.

9.3.2 In addition to the requirements of Part 2, a registration application for use of a particle accelerator will be approved only if the Department determines that:

9.3.2.1 The applicant is qualified by reason of training and experience to use the accelerator in question for the purpose requested in accordance with this part and Parts 4 and 10 in such a manner as to minimize danger to public health and safety or property;

9.3.2.2 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;

9.3.2.3 The issuance of the registration will not be inimical to the health and safety of the public, and the applicant satisfies any applicable special requirement in 9.4;

9.3.2.4 The applicant has appointed a Radiation Safety Officer in accordance with Part 2, Appendix 2A;

Commented [JJ5]:

Here and in subsequent provisions in the rule, "Part" is added where there is a reference to another regulatory part outside of Part 9.

9.3.2.5 The applicant and the applicant's staff have substantial experience in the use of particle accelerators and training sufficient for application to their intended uses;

~~9.3.2.6 The applicant has established a radiation safety committee to approve, in advance, proposals for uses of particle accelerators, whenever deemed necessary by the Department as required by the regulations. Where a radiation safety committee has not been established, the facility shall have written procedures to approve, in advance, proposals for use of particle accelerators; and~~

9.3.2.7 The applicant has an adequate training program for operators of particle accelerators.

9.3.3 If radioactive materials are also present at the facility, the requirements of Part 9 apply, as appropriate, ~~to coordination~~ and shall be coordinated with the ~~equivalent licensee~~ applicable license or application for a license.

RADIATION SAFETY REQUIREMENTS FOR THE USE OF PARTICLE ACCELERATORS

9.4 Use.

9.4.1 A registrant shall use the accelerator in accordance with the manufacturer's radiation safety and operating instructions.

9.5 Limitations.

9.5.1 No registrant shall permit any individual to act as an operator of a particle accelerator until such individual has:

9.5.1.1 Been instructed in radiation safety and shall have demonstrated an understanding thereof;

9.5.1.2 Received copies of and instruction in this part and the applicable requirements of Parts 4 and 10, pertinent registration conditions and the registrant's operating and emergency procedures, and shall have demonstrated understanding thereof; and

9.5.1.3 Demonstrated competence to use the particle accelerator, related equipment, and survey instruments which will be employed.

~~9.5.2 The radiation safety officer shall 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.~~

9.6 Shielding and Safety Design Requirements.

9.6.1 A qualified expert, registered with the Department in accordance with Appendix 2B or Appendix 2C, shall be consulted in the design of a particle accelerator installation and called upon to perform a radiation survey when the accelerator is first capable of producing radiation.

9.6.2 Each particle accelerator installation shall be provided with such primary and secondary barriers as are necessary to assure compliance with **Part 4, sections** 4.6 and 4.14.

9.7 Particle Accelerator Controls and Interlock Systems.

9.7.1 Instrumentation, readouts, and controls on the particle accelerator control console shall be clearly identified and easily discernible.

Commented [JJ6]:

The language "whenever deemed necessary..." is removed and replaced with "as required by the regulations" for clarity.

Additional language is added to provide an alternative to a Radiation Safety Committee to approve uses of particle accelerators. While larger facilities (such as a research institution) typically have a radiation safety committee, smaller facilities may not have such a committee, or be capable of, having such a committee due to staff limitations. The proposed language would allow a facility to use written procedures to review and approve uses of the particle accelerator.

Commented [JJ7]:

This provision is added for consistency with a similar provision in the SSRCR [Part I model rule](#), with the exception that Part I (also) authorizes the Radiation Safety Committee to terminate operations. As noted earlier, a smaller facility may not have a Radiation Safety Committee.

- 112 9.7.2 Each entrance into a target room or other high radiation area shall be provided with a safety
113 interlock that shuts down the machine under conditions of barrier penetration.
- 114 9.7.3 Each safety interlock shall be on a circuit which shall allow it to operate independently of all other
115 safety interlocks.
- 116 9.7.4 All safety interlocks shall be designed so that any defect or component failure in the safety
117 interlock system prevents operation of the accelerator.
- 118 **9.7.5** When a safety interlock system has been tripped, it shall only be possible to resume operation of
119 the accelerator **by:**
- 120 **9.7.5.1 Manually resetting the controls at the position where the safety interlock has been**
121 **tripped and, lastly, at the main control console; or**
- 122 **9.7.5.2 a**After the condition causing the interrupt has been corrected.
- 123 9.7.6 A scram button or other emergency power cutoff switch shall be located and easily identifiable in
124 all high radiation areas.
- 125 9.7.6.1 Such a cutoff switch shall include a manual reset so that the accelerator cannot be
126 restarted from the accelerator control console without resetting the cutoff switch.
- 127 **9.8 Warning Devices.**
- 128 9.8.1 Each location designated as high radiation area, and each entrance to such location, shall be
129 equipped with easily observable warning lights that operate when, and only when, radiation is
130 being produced.
- 131 9.8.2 Except in facilities designed for human exposure, each high radiation area shall have an audible
132 warning device which shall be activated for fifteen (15) seconds prior to the possible creation of
133 such high radiation area.
- 134 9.8.2.1 Such warning device shall be clearly discernible in all high radiation areas.
- 135 9.8.3 Barriers, temporary or otherwise, and pathways leading to high radiation areas shall be posted in
136 accordance with **Part 4, section 4.28**.
- 137 **9.9 Operating Procedures.**
- 138 9.9.1 Each particle accelerator, when not in operation, shall be secured to prevent unauthorized use.
- 139 9.9.2 The safety interlock system shall not be used to turn off the accelerator beam except in an
140 emergency.
- 141 9.9.3 Safety Checks.
- 142 9.9.3.1 All safety and warning devices, including interlocks, shall be checked for proper operation
143 at intervals not to exceed three **(3)** months. Safety checks shall assure, as appropriate,
144 proper operation of:
- 145 (1) Electrical interlocks at each room entrance;
- 146 (2) Timer, dose terminator, emergency off and door interlocks;

Commented [JJ8]:

Language is added for consistency with the language of the SSRCR [Part I model rule](#) (Section I.8e). The existing language is also retained as some systems may not have all of the controls identified in the model rule.

- 147 (3) Beam condition indicator lights on the accelerator unit, on the control panel, and
148 in the facility;
- 149 (4) Viewing systems;
- 150 (5) Doors from inside and outside the accelerator room; and
- 151 (6) Electrically assisted room doors with the accelerator unit electrical power turned
152 off.
- 153 9.9.3.2 A registrant shall promptly repair any system identified in 9.9.3.1 that is not operating
154 properly. The accelerator shall not be used until all repairs are completed.
- 155 9.9.3.3 Records.
- 156 (1) A registrant shall maintain a record of the results of each safety check required
157 by 9.9.3.1 for three (3) years at the accelerator facility for inspection by the
158 Department.
- 159 (2) The record shall include:
- 160 (a) The date of the safety check;
- 161 (b) The manufacturer's name, model number, and serial number for the
162 accelerator;
- 163 (c) The manufacturer's name, model number, serial number and calibration
164 date of the instrument used to conduct any measurements;
- 165 (d) Notations indicating the operability of each entrance door interlock, each
166 electrical or mechanical stop, each beam condition indicator light, the
167 viewing system, and doors: and
- 168 (e) The signature of the individual who performed the periodic spot checks.
- 169 9.9.3.4 If the result of the safety checks required in 9.9.3.1 indicate the malfunction of any
170 system specified in 9.9.3.1, the registrant shall lock the control console in the "off"
171 position and not use the unit except as may be necessary to repair, replace, or check the
172 malfunctioning system.
- 173 9.9.4 Electrical circuit diagrams of the accelerator and the associated safety interlock systems shall be
174 kept current and maintained for inspection by the Department and shall be available to the
175 operator at each accelerator facility.
- 176 9.9.5 If, for any reason, it is necessary to intentionally bypass a safety interlock or interlocks, such
177 action shall be:
- 178 9.9.5.1 Authorized by the Radiation Safety Officer;
- 179 9.9.5.2 Recorded in a permanent log and a notice posted at the accelerator control console; and
- 180 9.9.5.3 Terminated as soon as possible.
- 181 9.9.6 Safety Instructions.

- 182 9.9.6.1 A copy of the current operating and the emergency procedures shall be maintained at the
183 accelerator control panel. These instructions shall inform the operator of:
- 184 (1) The procedure to be followed if the operator is unable to turn the accelerator off
185 with controls at the control panel or any other abnormal operation occurs; and
- 186 (2) The names and telephone numbers of the authorized users and Radiation Safety
187 Officer to be immediately contacted if the accelerator or console operates
188 abnormally; and
- 189 9.9.6.2 A registrant shall provide instruction in the topics identified in 9.9.6.1 to each individual
190 who operates an accelerator and shall provide appropriate refresher training to each
191 individual operator at intervals not to exceed one (1) year.
- 192 9.9.6.3 A registrant shall maintain a record of each individual receiving instructions required by
193 9.9.6.2, a description of the instruction, the date of instruction, and the name of the
194 individual who gave the instruction for three (3) years.
- 195 **9.10 Radiation Monitoring Requirements.**
- 196 9.10.1 There shall be available at each particle accelerator facility appropriate portable monitoring
197 equipment which is operable and has been appropriately calibrated for the radiations being
198 produced at the facility.
- 199 9.10.1.1 Such equipment shall be tested for proper functioning prior to each day of
200 accelerator operation and calibrated at intervals not to exceed one (1) year and
201 after each servicing and repair.
- 202 **9.10.2** A radiation protection survey shall be performed and documented by a qualified expert,
203 ~~acceptable to~~ **registered with** the Department, when changes have been made in shielding,
204 operation, equipment, or occupancy of adjacent areas.
- 205 9.10.2.1 A registrant shall maintain a record of the radiation measurements made
206 following installation of the accelerator for the duration of the registration and
207 when subsequent changes occur that could potentially affect the radiation levels
208 in adjacent areas.
- 209 9.10.2.2 The record required by 9.10.2.1 shall include:
- 210 (1) The date of the measurements;
- 211 (2) The manufacturer's name, model number and serial number of the accelerator;
- 212 (3) A description of the accelerator configuration including whether there were any
213 test objects in the accelerator beam;
- 214 (4) The instrument used to measure radiation levels;
- 215 (5) A plan of the areas surrounding the accelerator that were surveyed;
- 216 (6) The measured dose rate at several points in each area expressed in microsievert
217 (millirem) per hour;
- 218 (7) The calculated maximum level of radiation over a period of one (1) week for each
219 restricted and unrestricted area; and

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Section 9.10 is formatted for appearance and alignment of text.

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Language is updated here, to clarify that a qualified expert must be registered with the department, consistent with language used other Colorado radiation control regulations.

- 220 (8) The signature of the Radiation Safety Officer.
- 221 9.10.3 The radiation levels in all high radiation areas not in the exposure room shall be continuously
222 monitored.
- 223 9.10.3.1 The monitoring devices shall be electrically independent of the accelerator
224 control and safety interlock systems and capable of providing a readout at the
225 control panel.
- 226 9.10.4 All area monitors shall be calibrated at intervals not to exceed one (1) year and after each
227 servicing and repair.
- 228 9.10.5 Whenever applicable, periodic surveys shall be made to determine the amount of airborne
229 particulate radioactivity present.
- 230 9.10.6 All surveys shall be made in accordance with the written procedures established by a qualified
231 expert, registered with the Department, or the Radiation Safety Officer.
- 232 9.10.7 Records of all radiation protection surveys, calibrations, and instrumentation tests shall be
233 maintained for three (3) years at the accelerator facility for inspection by the Department.
- 234 **9.11 Ventilation Systems.**
- 235 9.11.1 Ventilation systems shall be provided to ensure that personnel entering any area where airborne
236 radioactivity may be produced will not be exposed to airborne radioactive material in excess of
237 those limits specified in Part 4, Appendix 4B, Table 4B1.
- 238 9.11.2 A registrant shall not vent, release, or otherwise discharge airborne radioactive material to an
239 unrestricted area which exceeds the limits specified in Part 4, Appendix 4B, Table 4B2, except as
240 authorized pursuant to **Part 4, section 4.33**.
- 241 9.11.3 For purposes of 9.11.1 and 9.11.2, concentrations may be averaged over a period not greater
242 than one (1) year.
- 243 9.11.4 Every effort should be made to maintain releases of radioactive material to unrestricted areas as
244 far below the limits prescribed in 9.11.1 and 9.11.2 as is reasonably achievable.
- 245
- 246 [* * * END OF RULE * * *]

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