Kansas Administrative Regulations

Department of Health and Environment

Article 35.—Radiation

28-35-219a. Caution signs and labels.

(a) General.

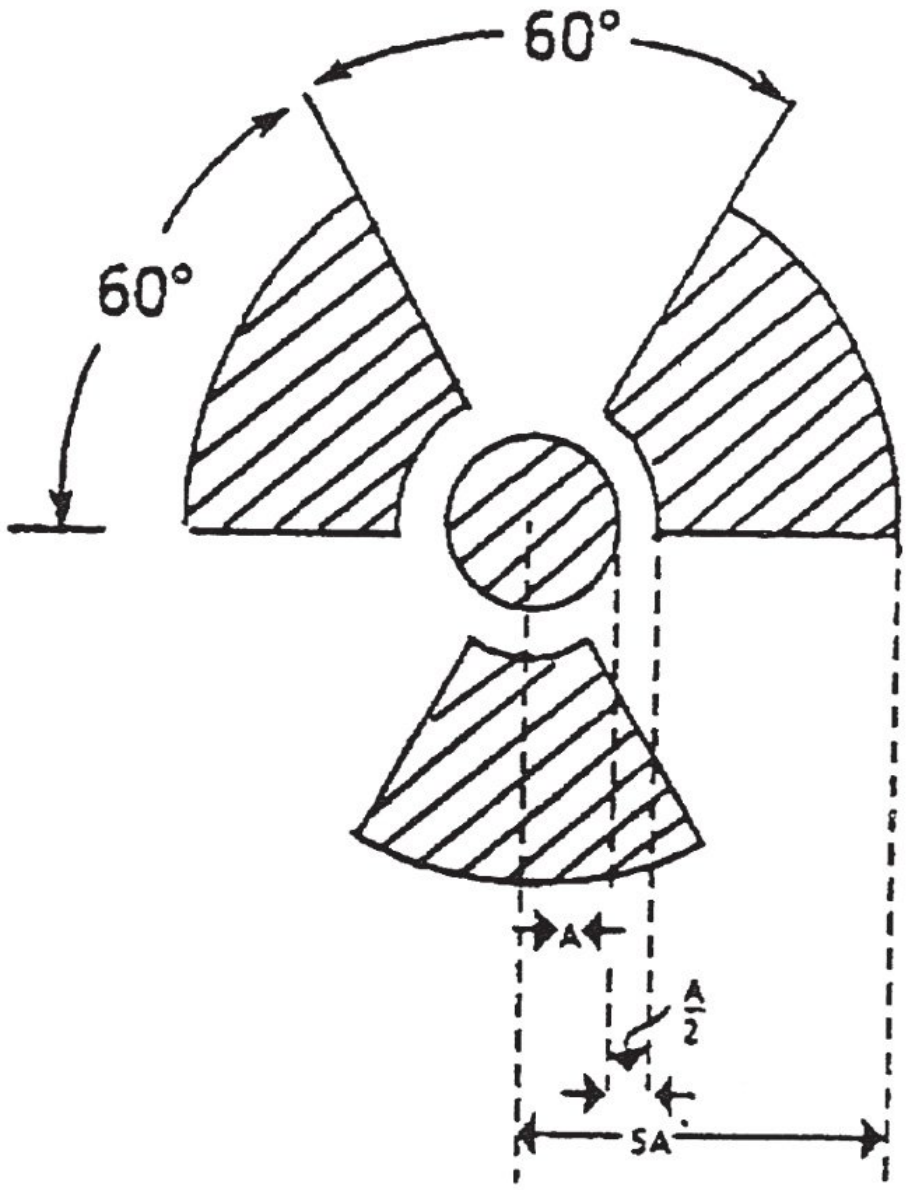
(1) Except as otherwise authorized by the department, the symbol prescribed by this regulation shall use the conventional radiation caution colors, which are magenta, purple, or black on a yellow background. The symbol shall be the conventional three-blade design with the phrases and graphic as follows:

CAUTION (or DANGER)

RADIATION SYMBOL

(A) Cross-hatch area shall be magenta, purple, or black.

(B) Background shall be yellow.



(2) In addition to the contents of signs and labels prescribed in this regulation, any licensee or registrant may provide on or near signs and labels any additional information that is appropriate in aiding individuals to minimize exposure to radiation.

(b) Radiation areas. Each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the following words:

CAUTION (or DANGER)
RADIATION AREA

(c) High radiation areas.

(1) Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the following words:

CAUTION (or DANGER)
HIGH RADIATION AREA

(2) Each registrant or licensee shall ensure that the entrance or access point to a high radiation area meets one or more of the following conditions:

(A) Is equipped with a control device that, upon entry into the area, causes the level of radiation to be reduced below that at which an individual might receive a deep dose equivalent of 100 millirems (1.0 mSv) in one hour at 30 centimeters from any surface that the radiation penetrates; or

(B) is equipped with a control device that energizes a conspicuous visible or audible alarm signal in such a manner that the individual entering the high radiation area and the licensee or a supervisor of the activity is made aware of the entry; or

(C) is required to be locked except during periods when access to the area is required, with positive control over each individual entry.

(3) The controls required by paragraphs (c)(2) and (d)(2) shall be established so that no individual will be prevented from leaving a high radiation area or a very high radiation area.

(4) If a high radiation area is established for a period of 30 days or less, direct surveillance to prevent unauthorized entry may be substituted for the controls required by paragraph (c)(2) of this regulation.

(5) Any licensee or registrant may apply to the department for approval of methods not included in paragraphs (c)(2), (4), and (6) of this regulation. The proposed alternatives shall be approved by the secretary if the licensee or registrant demonstrates that the alternative methods of control will prevent unauthorized entry into a high radiation area, and that the requirement of paragraph (c)(3) of this regulation is met.

(6) In place of the controls required by this regulation for a high radiation area, the licensee or registrant may substitute continuous direct or electronic surveillance that is capable of preventing unauthorized entry.

(7) The licensee or registrant shall not be required to control each entrance or access point to a room or other area that is a high radiation area solely because of the presence of radioactive materials prepared for transport and packaged and labeled in accordance with the regulations of the U.S. department of transportation if the following conditions are met:

(A) The packages do not remain in the area longer than three days.

(B) The dose rate at one meter from the external surface of any package does not exceed 0.1 mSv (0.01 rem) per hour.

(8) The licensee or registrant shall not be required to control entrance or access to rooms or other areas in hospitals solely because of the presence of patients containing radioactive material if there are personnel in attendance who are taking the necessary precautions to prevent the exposure of individuals to radiation or radioactive material in excess of the established limits in these regulations and to operate within the ALARA provisions of the licensee's or registrant's radiation protection program.

(9) The registrant shall not be required to control entrance or access to rooms or other areas containing sources of radiation capable of producing a high radiation area as described in this regulation if the registrant has met all the specific requirements for access and control specified in other applicable regulations, part 7 for industrial radiography, part 5 for X-rays in the healing arts, and part 9 for particle accelerators.

(d) Very high radiation areas.

(1) Each very high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the following words:

GRAVE DANGER
VERY HIGH RADIATION AREA

(2) Each registrant or licensee shall institute measures to ensure that an individual is not able to gain unauthorized or inadvertent access to an area in which radiation levels could be encountered at five Gy (500 rad) or more in one hour at one meter from a

source of radiation or any surface through which the radiation penetrates. This area is called a very high radiation area.

(A) Paragraph (d)(2) shall not apply to rooms or areas in which diagnostic X-ray systems are the only source of radiation, or to non-self-shielded irradiators.

(B) The registrant or licensee shall not be required to control entrance or access to rooms or other areas containing sources of radiation capable of producing a very high radiation area, as described in this regulation, if the registrant or licensee has met all the specific requirements for access and control specified in part 7 for industrial radiography, part 5 for X-rays in the healing arts, and part 9 for particle accelerators.

(3) Control of access to very high radiation areas; irradiators.

(A) Paragraph (d)(3) shall apply to licensees or registrants with sources of radiation in non-self-shielded irradiators and shall not apply to sources of radiation used in teletherapy, in industrial radiography, or in completely self-shielded irradiators in which the source of radiation is both stored and operated within the same shielding radiation barrier and, in the designed configuration of the irradiator, is always physically inaccessible to any individual and cannot create a high level of radiation in an area that is accessible to any individual.

(B) Each area in which there could exist radiation levels in excess of five Gy (500 rad) in one hour at one meter from a source of radiation that is used to irradiate materials shall be equipped with entry control devices that perform the following:

(i) Function automatically to prevent any individual from inadvertently entering a very high radiation area;

(ii) permit deliberate entry into the area only after a control device is actuated that causes the radiation level within the area, from the source of radiation, to be reduced below that at which it would be possible for an individual to receive a deep dose equivalent in excess of 1 mSv (0.1 rem) in one hour; and

(iii) prevent operation of the source of radiation if the source would produce radiation levels in the area that could result in a deep dose equivalent to an individual in excess of one mSv (0.1 rem) in one hour.

(C) Additional control devices shall be provided so that, upon failure of the entry control devices to function as required in this regulation, both of the following will occur:

(i) The radiation level within the area, from the source of radiation, is reduced below the level at which it would be possible for an individual to receive a deep dose equivalent in excess of one mSv (0.1 rem) in one hour.

(ii) Conspicuous visible and audible alarm signals are generated to make an individual attempting to enter the area aware of the hazard and at least one other authorized individual who is physically present, familiar with the activity, and prepared to render or summon assistance aware of the failure of the entry control devices.

(D) The licensee or registrant shall provide control devices so that, upon the failure or removal of physical radiation barriers other than the sealed sources shielded storage container, both of the following will occur:

(i) The radiation level from the source of radiation is reduced below the level at which it would be possible for an individual to receive a deep dose equivalent in excess of one mSv (0.1 rem) in one hour.

(ii) Conspicuous visible and audible alarm signals are generated to make potentially affected individuals aware of the hazard and to make the licensee, registrant, or at least one other individual who is familiar with the activity and prepared to render or summon assistance aware of the failure or removal of the physical barrier.

(E) If the shield for stored sealed sources is a liquid, the licensee or registrant shall provide the means to monitor the integrity of the shield and to automatically signal the loss of adequate shielding.

(F) Physical radiation barriers that comprise permanent structural components, including walls, that have no credible probability of failure or removal in ordinary circumstances shall not be required to meet the requirements of paragraphs (d)(3)(D) and (E).

(G) Each area shall be equipped with devices that automatically generate conspicuous visible and audible alarm signals to alert personnel in the area before the source of radiation can be put into operation and in time for any individual in the area to operate a clearly identified control device, which shall be installed in the area and which shall prevent the source of radiation from being put into operation.

(H) Each area shall be controlled by the use of any administrative procedures and devices necessary to ensure that the area is cleared of personnel before each use of the source of radiation.

(I) Each area shall be checked by a measurement of the radiation to ensure that, before the first individual's entry into the area after any use of the source of radiation, the radiation level from the source of radiation in the area is below the level at which it would be possible for an individual to receive a deep dose equivalent in excess of one mSv (0.1 rem) in one hour.

(J) The entry control devices required in paragraph (d)(3) shall be tested for proper functioning.

(i) Testing shall be conducted before initial operation with the source of radiation on any day, unless operations were continued uninterrupted from the previous day.

(ii) Testing shall be conducted before resuming operation of the source of radiation after any unintentional interruption.

(iii) The licensee or registrant shall submit and adhere to a schedule for periodic tests of the entry control and warning systems.

(K) The licensee or registrant shall not conduct operations, other than those necessary to place the source of radiation in safe condition or to effect repairs on controls, unless the control devices are functioning properly.

(L) Entry and exit portals that are used in transporting materials to and from the irradiation area and that are not intended for use by individuals shall be controlled by those devices and administrative procedures necessary to physically protect and warn against inadvertent entry by any individual through these portals. Exit portals for irradiated materials shall be equipped to detect and signal the presence of any loose radioactive material that is carried toward such an exit and automatically to prevent any loose radioactive material from being carried out of the area.

(4) Licensees, registrants, or applicants for licenses or registrations for sources of radiation subject to paragraph (d)(3) that will be used in a variety of positions or in locations including open fields or forests that make it impracticable to comply with certain requirements of this regulation, including those for the automatic control of radiation levels, may apply to the department for approval of alternative safety

measures. Alternative safety measures that are at least equivalent to those specified in paragraph (d)(3) shall be provided. At least one of the alternative measures shall include an entry-preventing interlock control based on a measurement of the radiation that ensures the absence of high radiation levels before an individual can gain access to the area where such sources of radiation are used.

(e) Airborne radioactivity areas. Each airborne radioactivity area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the following words:

CAUTION (or DANGER)
AIRBORNE RADIOACTIVITY AREA

(f) Additional requirements.

Each area or room in which any radioactive material is used or stored in an amount exceeding 10 times the quantity of radioactive material listed in appendix C in "appendices to part 4: standards for protection against radiation," as adopted by reference in K.A.R. 28-35-135a, shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the following words:

CAUTION (or DANGER)
RADIOACTIVE MATERIAL

(g) Containers.

(1) Except as otherwise provided in this subsection, each container of radioactive material shall bear a durable, clearly visible label identifying the radioactive contents.

(2) Each label required by paragraph (g) (1) shall bear the radiation caution symbol specified in paragraph (a) (1) and the following words:

CAUTION (or DANGER)
RADIOACTIVE MATERIAL

Each label shall also provide sufficient information to permit the individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposure. As appropriate, the label information may include

radiation levels, description of the contents, an estimate of the activity, and the date for which the activity is estimated.

(3) The labeling required under paragraph (g) (1) of this regulation shall not be required for any of the following:

(A) Containers that do not contain radioactive material in quantities greater than the applicable quantities listed in appendix C in "appendices to part 4: standards for protection against radiation," which is adopted by reference in K.A.R. 28-35-135a;

(B) containers that do not contain radioactive material in concentrations greater than the applicable concentrations listed in appendix B, table I, column 2 in "appendices to part 4: standards for protection against radiation," which is adopted by reference in K.A.R. 28-35-135a;

(C) containers attended by an individual who takes the precautions necessary to prevent the exposure of any individual to radiation or radioactive material in excess of the limits established by these regulations;

(D) containers in transport and packaged and labeled in accordance with the U.S. department of transportation regulations;

(E) containers that are accessible only to individuals authorized to handle or use the containers or to work in the containers' vicinity, if the contents are identified to those individuals by a readily available written record, including containers in water-filled canals, storage vaults, hot cells, and similar locations; or

(F) manufacturing and process equipment, including piping and tanks.

(4) Before disposing of an empty uncontaminated container in an unrestricted area, each licensee shall remove or deface the radioactive material label or otherwise clearly indicate that the container no longer contains radioactive material.

(h) Each radiation machine shall be labeled in a manner cautioning individuals that radiation is produced when the machine is being operated.

(Authorized by and implementing K.S.A. 48-1607; effective, T-85-43, Dec. 19, 1984; effective May 1, 1985; amended Sept. 20, 1993; amended Oct. 17, 1994; amended Dec. 30, 2005.)