MICHIGAN DEPARTMENT OF COMMUNITY HEALTH
RADIATION SAFETY SECTION
IONIZING RADIATION RULES

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PART 1. GENERAL PROVISIONS

R325.5001. Purpose and scope

Rule 1. These rules, except as otherwise specifically provided, apply to all persons who own, receive, acquire, possess, use or transfer any ~~source of~~ radiation machine in this state. ~~Regulation by the state of source material, byproduct material and special nuclear material in quantities not sufficient to form a critical mass is subject to an agreement between the state and the NRC and to 10 CFR Part 150 of NRC regulations. These rules do not apply to a person to the extent that the person is subject to regulation by the NRC. A person is subject to these rules unless specifically exempted under the act.~~

~~[*Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.*]~~

R325.5002. Hearing procedure.

Rule 2. (1) Prior to the issuance of an order, the department shall afford opportunity for hearing which shall be conducted pursuant to Act No. 306 of the Public Acts of 1969 as amended being "24.201 et. seq. of the Michigan Compiled Laws.

(2) In a contested case, the department shall conduct a hearing as provided in Act No. 306 of the Public Acts of 1969 as amended.

R325.5003. Definitions Ab to A~~i~~k.

Definitions that apply to radioactive materials regulation have been deleted. Added and amended definitions are from SSRCR parts that have been used to update the Michigan rules.

Rule 3. (1) "Absorbed dose" means ~~the energy imparted to matter by radiation per unit mass of irradiated material at the place of interest. The special unit of absorbed dose is the rad.~~ the energy imparted by ionizing radiation per unit mass of irradiated material. The units of absorbed dose are the gray (Gy) and the rad.

(2) "Accelerator" or "particle accelerator" means a radiation machine designed for or capable of accelerating electrically charged particles such as electrons, protons, ~~or~~ deuterons, or heavy ions with an electrical potential in excess of 1 MeV. ~~Radiation machines designed and used exclusively for the production of electron beams or x-radiation for any of the following purposes except those capable of producing radioactive material in excess of exempt quantities listed in schedule B of Rule 147 are excluded from this definition:~~

~~**(A)** The diagnosis or treatment of patients.~~

~~**(B)** Industrial radiography.~~

~~**(C)** Examination of the microscopic structure of materials.~~

~~**(D)** Manufacturing process control.~~

~~**(E)** Research and development.~~

~~**(F)** Demonstration of scientific principles for educational purposes.~~

~~**(3)** "Accelerator material" means any material made radioactive by exposing it in a particle accelerator.~~

~~**(4)**~~**(3)** "Act" means Act No. ~~305~~ 368 of the Public Acts of ~~1972~~ 1978 being ~~"325.451~~ (333.13501?)et. Seq. of the Michigan Compiled Laws. The terms defined in the Act have the same meanings when used in these rules.

~~**(5)** "Agreement material" means "byproduct material", "source material", or "special nuclear material in quantities not sufficient to form a critical mass" which is subject to regulation by this state under an agreement between the NRC and this state pursuant to section 274 of the federal atomic energy act of 1954, as amended, being 42. U.S.C. '2021 (Supp. 1973).~~

(4) **"**Adult" means an individual 18 or more years of age.

~~(6) "Agreement state" means a state with which the NRC has entered into an effective agreement pursuant to section 274b of the federal atomic energy act of 1954, as amended, being 42 U.S.C. '2021 (Supp. 1973).~~

(5) "Air kerma" means kerma in air (see kerma).

~~**(7)** "Airborne radioactive material" means any radioactive material dispersed in the air in the form of dusts, fumes, mists, vapors or gases.~~

(6) "AKR" means air kerma rate (see kerma)

~~**(8)** "Airborne radioactivity area" means a room, enclosure or operating area in which airborne radioactive material exists in concentrations in excess of the amounts specified in column 1, table I of rules 261 to 269 or a room, enclosure or operating area in which airborne radioactive material exists in concentrations which, averaged over the number of hours in any week during which individuals are in the area, exceed 25% of the amounts specified in column 1, table I of rules 261 to 269.~~

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R325.5004. Definitions Al to Au.

Rule 4. **(1)** ~~"Aluminum equivalent" means the thickness of type 1100 aluminum alloy with nominal chemical composition of 99.00% minimum aluminum and 0.12% copper which will provide the same attenuation, under specified conditions, as the material in question.~~ "Aluminum equivalent" means the

thickness of aluminum (type 1100 alloy) affording the same attenuation, under specified conditions as the material in question.

~~**(2)** "Atomic Energy Commission" or "AEC" means the United States atomic energy commission, which was abolished by Section 104 of the federal energy reorganization act of 1974, being Public Law 93-438. See nuclear regulatory commission.~~

(2) "As low as is reasonably achievable" (ALARA) means making every reasonable effort to maintain exposures to radiation as far below the dose limits in these regulations as is practical, consistent with the purpose for which the registered activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to registered sources of radiation in the public interest.

(3) "Assembler" means any person engaged in the business of assembling, replacing, or installing one or more components into an x-ray system or subsystem. The term includes the owner of an x-ray system or his or her employee or agent who assembles components into an x-ray system that is subsequently used to provide professional or commercial services.

~~(3)~~(4) ~~"Attenuation block" means a block or stack, having dimensions 20 centimeters by 20 centimeters by 3.8 centimeters, of type 1100 aluminum alloy or other material with the same aluminum equivalent.~~ "Attenuation block" means a block or stack of type 1100 aluminum alloy or aluminum alloy having equivalent attenuation with dimensions 20 centimeters by 20 centimeters by 3.8 centimeters.

~~**(4)** "Authorized recipient" means any person licensed or otherwise authorized in writing by the department, the federal government or any agency thereof, or an agreement state to possess radioactive material or as authorized to the extent permitted by exemption from these rules.~~

(5) "Automatic exposure control" (AEC) means a device which automatically controls ~~1~~one or more technique factors in order to obtain at a preselected location(s) a required quantity of radiation. Automatic exposure rate control (AERC) means a device which automatically controls one or more technique factors in order to obtain at a preselected location(s) a required quantity of radiation per unit time.

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R325.5005. Definitions B.

Rule 5. (1) "Barrier" includes a primary protective barrier, a secondary protective barrier or a personnel barrier.

(2) "Beam axis" means a line from the source through the centers of the x-ray ~~or gamma-ray~~ fields.

(3) "Beam-limiting device" means a device, which provides a means to restrict the dimensions of the x-ray ~~or gamma-ray~~ field.

~~**(4)** "Byproduct material" means any radioactive material, except special nuclear material, yielded in or made radioactive by exposing it to the radiation incident to the process of producing or utilizing special nuclear material.~~

(4) "Bone densitometry system" means a medical device which uses electronically-produced ionizing radiation to determine the density of bone structures of human patients.

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R325.5006. Definitions C.

Rule 6. (1) "C-arm x-ray system" means an x-ray system in which the image receptor and x-ray tube housing assembly are connected by a common mechanical support system in order to maintain a desired spatial relationship. This system is designed to allow a change in the projection of the beam through the patient without a change in the position of the patient.

(2) "Cabinet x-ray system" means an x-ray system with the x-ray tube installed in an enclosure, hereinafter termed a cabinet, that is independent of existing architectural structures except the floor on which it may be placed. The cabinet x-ray system is intended to contain at least that portion of a material being irradiated, provide radiation attenuation, and exclude personnel from its interior during generation of radiation. This definition includes x-ray systems designed for baggage inspection. An x-ray tube used within a shielded part of a building, or x-ray equipment that may temporarily or occasionally incorporate portable shielding, is not considered a cabinet x-ray system.

~~**(1)** "Calendar quarter" means not less than 12 consecutive weeks nor more than 14 consecutive weeks. The first calendar quarter of each year shall begin in January and subsequent calendar quarters shall be arranged so that a day is not included in more than 1 calendar quarter nor is a day in any 1 year omitted from inclusion within a calendar quarter. A licensee or registrant shall not change the method observed by him of determining calendar quarters for purposes of these rules except at the beginning of a calendar year.~~

See "Quarter".

(3) "Calibration" means the determination of (1) the response or reading of an instrument relative to a series of known radiation values over the range of the instrument, or (2) the strength of a source of radiation relative to a standard.

(4) "Cassette holder" means a device, other than a spot-film device, that supports and/or fixes the position of an x-ray film cassette during an x-ray exposure.

(5) "Cephalometric device" means a device intended for the radiographic visualization and measurement of the dimensions of the human head in dental radiography.

~~**(2)**~~**(6)** "Coefficient of variation" means the ratio of the standard deviation to the mean value of a population of observations. It is estimated using the following equation:

$$C = \frac{s}{\overline{X}} = \frac{1}{\overline{X}}\left[\sum_{i=1}^{n}\frac{\left(X_i - \overline{X}\right)^2}{n-1}\right]^{\frac{1}{2}}$$

where: s **= Estimated standard deviation of the population.**

$\overline{X}$ **= Mean value of observations in sample.**

X_i **= i th observation in sample.**

n **= Number of observations in sample.**

(7) "Computed tomography" or "CT" means the production of a tomogram by the acquisition and computer processing of x-ray transmission data.

~~**(3)**~~**(8)** "Controlled area" means ~~a restricted area.~~an area, outside of a restricted area but inside the site boundary, access to which can be limited by the registrant for any reason.

(9) "Control panel" means that part of the x-ray control upon which are mounted the switches, knobs, pushbuttons, and other hardware necessary for manually setting the technique factors.

~~(4)~~**(10)** "Cooling curve" means the graphical relationship between heat units stored and cooling time.

~~**(5)** "Curie" means the quantity of radioactive material which decays at the rate of 3.7 X 10^{10} disintegrations per second (dps). Commonly used submultiples of the curie (Ci) are the millicurie (mCi), the microcurie (Ci) and the nanocurie (nCi). One millicurie = 0.001 curie = 3.7 X 10^{7} dps. One microcurie = 0.000001 curie = 3.7 X 10^{4} dps. One nanocurie = 0.000000001 curie = 37 dps. Curie is the special unit of measurement of radioactivity.~~

~~[*Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.*]~~

R325.5007. Definitions D.

Rule 7. (1) ~~"Department" means the department of public health.~~ "Deep-dose equivalent" means the dose equivalent at a tissue depth of 1 cm (1000 mg/cm^2) and applies to whole-body exposure.

(2) "Department" means the department of community health.

~~(2)~~**(3)** "Diagnostic source assembly" means a diagnostic tube housing assembly with a beam-limiting device attached.

~~(3)~~**(4)** "Diagnostic type tube housing" (see leakage technique factors) ~~means an x-ray tube housing constructed so that the leakage radiation at a distance of 1 meter from the tube target does not exceed 0.10 roentgen per hour under the following conditions:~~

~~**(A)** For capacitor energy storage equipment when operated at is leakage technique factors.~~

~~**(B)** For field emission equipment rated for pulsed operation when operated at its leakage technique factors.~~

~~**(C)** For all other equipment when operated at 70 kVp and 10 milliamps or its calculated equivalent.~~

~~**(4)**~~**(5)** "Diagnostic x-ray system" means an x-ray system designed for irradiation of any part of the human or animal body for the purpose of diagnosis or visualization.

~~**(5)**~~**(6)** ~~"Dose" means absorbed dose or dose equivalent as appropriate.~~ "Dose" or "Radiation dose" is a generic term that means absorbed dose, deep dose equivalent, shallow dose equivalent, or lens dose equivalent, as defined in other paragraphs of this section.

~~**(6)**~~**(7)** "Dose equivalent" means the ~~absorbed dose in rads times certain modifying factors and is a quantity that expresses on a common scale for all radiation a measure of the postulated effect on a given organ from small amounts of radiation. The special unit of dose equivalent is the rem.~~ product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units of dose equivalent are the sievert (Sv) and rem.

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(8) "Dose limits" means the permissible upper bounds of radiation doses established in accordance with these rules. for purposes of these rules, "limits" is an equivalent term.

(9) "Dose monitor unit (DMU)" or "monitor unit (MU)" means a unit response from the beam monitoring system from which the absorbed dose can be calculated.

R325.5008. Definitions E and F.

Rule 8. (1) "Electrically grounded" means provided with an electrically conducting connection which joins the electrical circuit or equipment to the earth or to the nearest available conducting body which serves in place of the earth.

(2) "Entrance exposure rate" means the exposure free in air per unit time at the point where the center of the useful beam enters the patient.

~~**(2)**~~**(3)** ~~"Exposure" means the quotient of dQ by dm where dQ is the absolute value of the total charge of the ions of 1 sign produced in air when all the electrons (negatrons and positrons) liberated by photons in a volume element of air having mass dm are completely stopped in air. The special unit of exposure is the roentgen.~~ "Exposure" (x) means the quotient of dq by dm where dq is the absolute value of the total charge of the ions of one sign produced in air when all the electrons and positrons liberated or created by photons in air of mass dm are completely stopped in air; thus x=dq/dm, in units of c/kg.

~~**(3)**~~**(4)** "Exposure rate" means the exposure per unit of time~~, such as R/min, mR/h~~.

(5) "Extremity" means hand, elbow, arm below the elbow, foot, knee, and leg below the knee.

~~**(4)**~~**(6)** "Facility" means the location, building, vehicle, or complex under one administrative control, at which 1 or more ~~devices or sources of~~ radiation machines are installed, ~~or~~ located, and/or used~~within 1 building or under 1 roof and are under the same administrative control~~.

~~**(5)**~~**(7)** "Field emission equipment" means equipment which uses an x-ray tube in which electron emission from the cathode is due solely to the action of an electric field.

~~**(6)**~~**(8)** "Filter" means material placed in the useful beam to absorb preferentially the less penetrating radiation.

~~(7)~~**(9)** ~~"Fluoroscopic imaging assembly" means a component which comprises a reception system in which x-ray photons produce a fluoroscopic image. It includes equipment housings, electrical interlocks if any, the primary protective barrier, and structural material providing linkage between the image receptor and the diagnostic source assembly.~~ "Fluoroscopic imaging assembly" means a subsystem in which x-ray photons produce a set of fluoroscopic images or radiographic images recorded from the fluoroscopic image receptor. It includes the image receptor(s), electrical interlocks, if any, and structural material providing linkage between the image receptor and diagnostic source assembly.

(10) "Fluoroscopy" means a technique for generating x-ray images and presenting them instantaneously and continuously as visible images for the purpose of providing the user with a visual display of dynamic processes.

(11) "Focal spot (actual)" means the area projected on the anode of the x-ray tube bombarded by the electrons accelerated from the cathode and from which the useful beam originates.

~~(8)~~**(12)** "Food and drug administration" or "FDA" means the United States food and drug administration established by the federal food, drug and cosmetic act of 1938, as amended, being Public Law 75-717.

R325.5009. Definitions G and H.

Rule 9. (1) "Gantry" means that part of a radiation therapy system supporting and allowing movements of the radiation treatment head about a center of rotation.

~~(1)~~**(2)** "General purpose radiographic x-ray system" means a radiographic x-ray system which, by design or use, is not limited to radiographic examination of specific anatomical regions. Radiographic extremity only uses, such as podiatry, are excluded from the definition of general purpose radiographic x-ray system.

(3) "Gray" (Gy) means the system international (SI) unit of absorbed dose. One gray is equal to an absorbed dose of 1 Joule per kilogram (100 rad).

~~(2)~~**(4)** "Half-value layer" or "HVL" means the thickness of specified material which attenuates the beam of radiation to an extent such that the ~~exposure rate~~ AKR is reduced to 1/2 of its original value. In this definition the contribution of all scattered radiation, other than any which might be present initially in the beam concerned, is deemed to be excluded.

(5) "Healing arts screening" means the testing of human beings using an x-ray machine for the detection or evaluation of health indications when such tests are not specifically and individually ordered by a licensed practitioner of the healing arts legally authorized to prescribe such x-ray tests for the purpose of diagnosis or treatment.

(6) "Heat unit" means a unit of energy equal to the product of the peak kilovoltage, milliamperage, and seconds, i.e., kVp x mA x second.

~~(3)~~**(7)** ~~"High radiation area" means an area, accessible to individuals, in which there exists such radiation, that an individual could receive in any 1 hour a dose in excess of 100 millirems.~~ "High radiation area" means an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 1 mSv (0.1 rem) in 1 hour at 30 centimeters from the radiation source or 30 centimeters from any surface that the radiation penetrates.

~~(4)~~**(8)** "Human use" means the internal or external administration of radiation or radioactive materials to human beings.

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R325.5010. Definitions I to K.

Rule 10. (1) "Image intensifier" means a device, installed in its housing, which instantaneously converts an x-ray pattern into a corresponding light image of higher energy density.

(1)(2) ~~"Image receptor" means a device, such as a fluorescent screen or radiographic film, which transfers incident x-ray photons into a visible image or into another form which can be made into a visible image by further transformations.~~ "Image receptor" means any device, such as a fluorescent screen, radiographic film, x-ray image intensifier tube, solid-state detector, or gaseous detector, which transforms incident x-ray photons either into a visible image or into another form which can be made into a visible image by further transformations. In those cases where means are provided to preselect a portion of the image receptor, the term "image receptor" shall mean the preselected portion of the device.

(3) "Image receptor support device" means, for mammography x-ray systems, that part of the system designed to support the image receptor during a mammographic examination and to provide a primary protective barrier.

(2)(4) "Individual" means ~~a~~ any human being.

(5) "Industrial radiography" means an examination of the macroscopic structure of materials by the nondestructive method of utilizing ionizing radiation to make radiographic or fluoroscopic images.

(6) "Inherent filtration" means the filtration of the useful beam provided by the permanently installed components of the tube housing assembly.

(3)(7) "Inspection" means an official examination or observation to determine compliance with the act, these rules, ~~license conditions,~~ registration conditions or orders of the department.

~~(4)~~**(8)** "Installation" means a location, having boundaries specified by the ~~licensee or~~ registrant, where for a period of more than 30 days, 1 or more sources of radiation are used, operated or stored. A part of a building, an entire building, a plant or plant site may be designated as an installation.

(9) "Isocenter" means the center of the circle or sphere through which the useful beam axis passes while the gantry moves through its full range of motions.

(10) "Kerma" means the quantity as defined by the international commission on radiation units and measurements. the kerma, k, is the quotient of de_{tr} by dm, where de_{tr} is the sum of the initial kinetic energies of all the charged particles liberated by uncharged particles in a mass dm of material; thus $k=de_{tr}/dm$, in units of J/kg, where the special name for the unit of kerma is gray (Gy). when the material is air, the quantity is referred to as "air kerma."

(11) "Kilovolts peak" or "kVp" (see "peak tube potential")

R325.5011. Definitions L.

Rule 11. (1) ~~"Leakage radiation" means radiation emanating from the diagnostic or therapeutic source assembly except for the useful beam and radiation produced when the exposure switch or timer is not activated.~~ "Last-image hold" (LIH) radiograph means an image obtained either by retaining one or more fluoroscopic images, which may be temporally integrated, at the end of a fluoroscopic exposure or by initiating a separate and distinct radiographic exposure automatically and immediately in conjunction with termination of the fluoroscopic exposure.

(2) "Lateral fluoroscope" means the x-ray tube and image receptor combination in a biplane system dedicated to the lateral projection. it consists of the lateral x-ray tube housing assembly and the lateral image receptor that are fixed in position relative to the table with the x-ray beam axis parallel to the plane of the table.

(3) "Leakage radiation" means radiation emanating from the diagnostic source assembly except for:

(a) the useful beam; and

(b) radiation produced when the exposure switch or timer is not activated.

~~**(2)** "Leakage technique factors" means the technique factors associated with the tube housing assembly which are used in measuring leakage radiation. They are defined as follows:~~

~~**(A)** For capacitor energy storage equipment, the maximum rated number of exposures in an hour for operation at the maximum rated peak tube potential with the quantity of charge per exposure being 10 millicoulombs (mAs) or the minimum obtainable from the unit, whichever is larger.~~

~~**(B)** For field emission equipment rated for pulsed operation, the maximum rated number of x-ray pulses in an hour for operation at the maximum rated peak tube potential.~~

~~**(C)** For all other equipment, the maximum rated continuous tube current for the maximum rated peak tube potential~~

(4) "Leakage technique factors" means the technique factors associated with the diagnostic source assembly which are used in measuring leakage radiation. They are defined as follows:

(a) for diagnostic source assemblies intended for capacitor energy storage equipment, the maximum-rated peak tube potential and the maximum-rated number of exposures in an hour for operation at the maximum-rated peak tube potential with the quantity of charge per exposure being 10 millicoulombs (or 10 mAs) or the minimum obtainable from the unit, whichever is larger;

(b) for diagnostic source assemblies intended for field emission equipment rated for pulsed operation, the maximum-rated peak tube potential and the maximum-rated number of x-ray pulses in an hour for operation at the maximum-rated peak tube potential; and

(c) for all other diagnostic source assemblies, the maximum-rated peak tube potential and the maximum-rated continuous tube current for the maximum-rated peak tube potential.

(5) "Lens dose equivalent (LDE)" means the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm^2). and applies to the external exposure of the lens of the eye.

~~(3)~~(6) "Level" means radiation flux or intensity at a specific point. It is sometimes expressed in terms of the dose an individual would receive if he were at that point or location.

~~**(4)** "License" means a license issued pursuant to parts 2 or 3 except where otherwise specified.~~

~~(5)~~(7) "Light field" means the area of intersection of the light beam from the beam-limiting device and 1 of the set of planes parallel to and including the plane of the image receptor, whose perimeter is the locus of points at which the illumination is 1/4 of the maximum in the intersection.

~~(6)~~(8) "Line-voltage regulation" means the difference between the no-load and the load line potentials expressed as a percent of the load line potential; that is,

Percent line-voltage regulation $=100\ (V_n - V_l)/V_l$

Where: V_n = No-load line potential and

V_l = Load line potential.

R325.5012. Definitions M to O.

Rule 12. (1) "Manufactured" means produced or prepared for use or sale by an industrial manufacturing process. It includes factory assembly of components but does not include assembly of manufactured parts at the site of use.

(2) "Maximum line current" means the rms current in the supply line of an x-ray machine operating at its maximum rating.

~~**(3)** "Naturally occurring material" means radioactive material found radioactive in the normal isotopic distribution of elements rather than rendered radioactive by artificial means.~~

(3) "Megavolt (MV) [mega electron volt (MeV)]" means the energy equal to that acquired by a particle with one electron charge in passing through a potential difference of one million volts in a vacuum. [note: current convention is to use MV for photons and MeV for electrons.]

(4) "Member of the public" means any individual except when that individual is receiving an occupational dose.

~~**(4)** "Nuclear regulatory commission" or "NRC" means the United States nuclear regulatory commission established by section 201 of the federal energy reorganization act of 1974, being Public Law 93-438.~~

(5) "Minor" means an individual less than 18 years of age.

~~**(5)**~~**(6)** "Occupational dose" means ~~the dose received in the course of occupational exposure as calculated or estimated from dosimeters.~~ the dose received by an individual in the course of employment in which the individual's assigned duties for the registrant involve exposure to radiation machines, whether or not the radiation machines are in the possession of the registrant. Occupational dose does not include dose received: from background radiation, or as a patient from medical practices, or from voluntary participation in medical research programs, or as a member of the public.

~~**(6)** "Occupational exposure" means radiation exposure received by an individual in a restricted area, or in the course of employment in which the individual's duties involve being exposed to radiation. It does not include exposure of an individual to radiation for the purpose of diagnosis or therapy of the individual.~~

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(7) "Open-beam configuration" means an analytical x-ray system in which an individual could accidentally place some part of his body in the primary beam path during normal operation.

R325.5013. Definitions P to Q.

Rule 13. (1) "Particle accelerator" ~~or "accelerator"~~ (See accelerator) ~~means a radiation machine designed for or capable of accelerating electrically charged particles such as electrons, protons or deuterons, with an electrical potential in excess of 1 MeV. Radiation machines designed and used exclusively for the production of electron beams or x-radiation for any of the following purposes except those capable of producing radioactive material in excess of exempt quantities listed in schedule B of rule 147 are excluded from this definition:~~

~~**(A)** The diagnosis or treatment of patients.~~

~~**(B)** Industrial radiography.~~

~~**(C)** Examination of the microscopic structure of materials.~~

~~**(D)** Manufacturing process control.~~

~~**(E)** Research and development.~~

~~**(F)** Demonstration of scientific principles for educational purposes.~~

(2) "Peak tube potential" means the maximum value of the potential difference across the x-ray tube during an exposure.

(3) "Personnel barrier" means a barrier which restricts personnel from potential radiation exposure by restricting access to the vicinity of a source of radiation.

(4) "Personnel monitoring equipment" means a device such as a film badge, pocket dosimeter or thermoluminescent dosimeter (TLD) designed to be worn or carried by an individual for the purpose of estimating the radiation dose received by ~~him~~ that individual.

(5) "Phantom" means a volume of material behaving in a manner similar to tissue with respect to the attenuation and scattering of radiation. This requires that both the atomic number (z) and the density of the material be similar to that of tissue.

~~(5)~~**(6)** "Physician" means an individual licensed by this state to prescribe or dispense drugs in the practice of medicine.

~~(6)~~**(7)** "Primary protective barrier" means the material, excluding filters, placed in the useful beam to reduce the radiation exposure for protection purposes.

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(8) "Protective apron" means an apron made of radiation-attenuating materials used to reduce exposure to radiation.

(9) "Protective barrier" means a barrier of radiation absorbing material(s) used to reduce radiation exposure. the types of protective barriers are as follows:

(a) "primary protective barrier" means the material, excluding filters, placed in the useful beam.

(b) "secondary protective barrier" means the material which attenuates scattered and leakage radiation.

(9) "Qualified expert" means an individual having the knowledge and training to measure ionizing radiation, to evaluate safety techniques, and to advise regarding radiation protection needs, for example, individuals certified in the appropriate field by the American board of radiology, or the American board of health physics, or the American board of medical physics, or those having equivalent qualifications. With reference to the calibration of radiation therapy equipment, an individual having, in addition to the above qualifications, training and experience in the clinical applications of radiation physics to radiation therapy, for

example, individuals certified in therapeutic radiological physics or x-ray and radium physics by the American board of radiology, or those having equivalent qualifications.

(10) "Quarter" means a period of time of approximately 13 consecutive weeks equal to one-fourth of the year observed by the registrant, providing that the beginning of the first quarter in a year occurs in January and that no day is omitted or duplicated in consecutive quarters.

R325.5014. Definitions Ra.

Rule 14. (1) "Rad" is the traditional unit of absorbed dose. One rad is equal to an absorbed dose of 0.01~~means 1/100 of a~~ joule ~~of absorbed radiation energy~~ per kilogram of material, or 100 ergs per gram (0.01 gray)~~and is the special unit of absorbed dose~~.

(2) "Radiation" means ionizing radiation.

(3) "Radiation area" means an area, accessible to individuals, in which ~~there exists such radiation that an individual could receive in any 1 hour a dose in excess of 5 millirems, or in any 5 consecutive days a dose in excess of 100 millirems.~~ radiation levels could result in an individual receiving a dose equivalent in excess of 0.05 mSv (0.005 rem) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

(4) "Radiation machine" means a device capable of producing radiation except that which produces radiation only from radioactive material.

(5) "Radiation monitoring" means the periodic or continuous determination of the exposure rate or ~~contamination level~~ integrated exposure in an area (area monitoring) or of the dose received by an individual (personnel monitoring).

(6) "Radiation protection supervisor" means the individual specified by the ~~licensee or~~ registrant who has the authority and the responsibility for radiation protection.

~~**(7)** "Radiation worker" means an individual assigned work with or around sources of radiation or who, during the performance of his assigned duties, receives or is likely to receive a dose in any calendar quarter in excess of 300 millirems.~~

~~**(8)** "Radioactivity" means the property of certain isotopes of the basic elements of spontaneously emitting nuclear particles or gamma radiation or of emitting x-radiation following orbital electron capture or of undergoing spontaneous fission.~~

(7) "Radiography" means a technique for generating and recording an x-ray pattern for the purpose of providing the user with an image(s) after termination of the exposure.

~~**(9)**~~**(8)** "Rated line voltage" means the range of potentials, in volts, of the supply line specified by the manufacturer at which the x-ray machine is designed to operate.

~~**(10)**~~**(9)** "Rated output current" means the maximum allowable load current of the x-ray high-voltage generator.

~~**(11)**~~**(10)** "Rated output voltage" means the allowable peak potential, in volts, at the output terminals of the x-ray high-voltage generator.

~~**(12)**~~**(11)** "Rating" means the operating limits specified by the manufacturer.

~~[*Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.*]~~

~~[SKIP RULE 15?(IT WAS SKIPPED IN OLD RULES)]~~

R325.5016. Definitions Re to Ro.

Rule 16. (1) "Recording" means producing a ~~permanent form of a radiographic image resulting from x-ray or gamma-ray photons.~~ retrievable form of an image resulting from x-ray photons.

~~**(2)** "Rem" means the absorbed dose in rads multiplied by appropriate modifying factors which are determined by the quality of radiation and the conditions of exposure and is the special unit of dose equivalent. For the purpose of these regulations, each of the following is considered to be equivalent to a dose of one rem:~~

~~**(a)** An exposure of 1 roentgen of x or gamma radiation.~~

~~**(b)** A dose of 1 rad due to x, gamma or beta radiation.~~

~~**(c)** A dose of 0.1 rad due to neutrons or high energy protons.*~~

~~(d)A dose of 0.05 rad due to particles heavier than protons and with sufficient energy to reach the lens of the eye.~~

(2) "Rem" means the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rems is equal to the absorbed dose in rads multiplied by the quality factor (1 rem=0.01 sievert).

As used in this part, the quality factors for converting absorbed dose to dose equivalent are shown in Table 1.

Table 1--Quality factors and absorbed dose equivalencies

Type of radiation	Quality factor (Q)	Absorbed dose equal to a unit dose equivalent[a]
x-, gamma, or beta radiation	1	1
alpha particles, multiple-charged particles, fission fragments and heavy particles of unknown charge	20	.05
neutrons of unknown energy	10	.1
high-energy protons	10	.1

[a] absorbed dose in rad equal to 1 rem or the absorbed dose in gray equal to 1 sievert.

If it is more convenient to measure the neutron fluence rate than to determine the neutron dose equivalent rate in rems per hour or sieverts per hour, as provided in paragraph (b) of this section, 0.01 Sv (1 rem) of neutron radiation of unknown energies may, for purposes of the regulations in this part, be assumed to result from a total fluence of 25 million neutrons per square centimeter incident upon the body. If sufficient information exists to estimate the approximate energy distribution of the neutrons, the registrant may use the fluence rate per unit dose equivalent or the appropriate Q value from Table 2 to convert a measured tissue dose in rads to dose equivalent in rems.

Table 2--Mean quality factors, Q, and fluence per unit dose equivalent for monoenergetic neutrons

	Neutron energy (MeV)	Quality factor (Q)[a]	Fluence per unit dose equivalent [b] (neutrons cm^{-2} rem^{-1})
(Thermal).....	2.5×10^{-8}	2	980×10^{6}
	1×10^{-7}	2	980×10^{6}
	1×10^{-6}	2	810×10^{6}
	1×10^{-5}	2	810×10^{6}
	1×10^{-4}	2	840×10^{6}
	1×10^{-3}	2	980×10^{6}
	1×10^{-2}	2.5	1010×10^{6}
	1×10^{-1}	7.5	170×10^{6}
	5×10^{-1}	11	39×10^{6}
	1	11	27×10^{6}
	2.5	9	29×10^{6}
	5	8	23×10^{6}
	7	7	24×10^{6}
	10	6.5	24×10^{6}
	14	7.5	17×10^{6}
	20	8	16×10^{6}
	40	7	14×10^{6}
	60	5.5	16×10^{6}
	1×10^{2}	4	20×10^{6}
	2×10^{2}	3.5	19×10^{6}
	3×10^{2}	3.5	16×10^{6}
	4×10^{2}	3.5	14×10^{6}

[a] value of quality factor (Q) at the point where the dose equivalent is maximum in a 30-cm diameter cylinder tissue-equivalent phantom.

[b] monoenergetic neutrons incident normally on a 30-cm diameter cylinder tissue-equivalent phantom.

From latest 10CFR 20 (NRC).

~~* If it is more convenient to measure the neutron flux, or equivalent, than to determine the neutron absorbed dose in rads, 1 rem of neutron radiation may, for purposes of these regulations, be assumed to be equivalent to 14 million neutrons per square centimeter incident upon the body; or, if there exists sufficient information to estimate with reasonable accuracy the approximate distribution in energy of the neutrons, the incident number of neutrons per square centimeter equivalent to 1 rem may be estimated from the following table:~~

~~**NEUTRON FLUX DOSE EQUIVALENTS**~~

~~Neutron energy (MeV)~~	~~No. of neutrons per square centimeter for a dose equivalent of 1 rem (neutrons/cm^2)~~	~~Average flux to deliver 100 millirem in 40 hours (neutrons/cm^2 per second)~~
~~Thermal 970~~	~~x~~	~~10^6 670~~
~~0.0001 720~~	~~x~~	~~10^6 500~~
~~0.005 820~~	~~x~~	~~10^6 570~~
~~0.02 400~~	~~x~~	~~10^6 280~~
~~0.1 120~~	~~x~~	~~10^6 80~~
~~0.5 43~~	~~x~~	~~10^6 30~~
~~1.0 26~~	~~x~~	~~10^6 18~~
~~2.5 29~~	~~x~~	~~10^6 20~~
~~5.0 26~~	~~x~~	~~10^6 18~~
~~7.5 24~~	~~x~~	~~10^6 17~~
~~10.0 24~~	~~x~~	~~10^6 17~~
~~10 to 3014~~	~~x~~	~~10^6 10~~

(3) "Research and development" means either (a) theoretical analysis, exploration or experimentation, or (b) the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials and processes. This definition does not apply to human use.

(4) "Response time" means the time required for an instrument system to reach 90% of its final reading when the radiation-sensitive volume of the instrument system is exposed to a step change in radiation flux from zero sufficient to provide a steady state midscale reading.

(5) "Restricted area" ~~or "controlled area" means an area access to which is controlled by a licensee or registrant for purposes of protection of individuals from exposure to radiation or radioactive materials. It does not include an area used for residential quarters, although a separate room in a residential building may be set apart as a restricted area.~~ means an area, access to which is limited by the registrant for the purpose of protecting individuals against undue risks from exposure to radiation. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area.

(6) "Roentgen (R)" means 2.58 X 10^{-4} Coulombs/kilogram of air and is the ~~special~~ traditional unit of exposure.

~~[*Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.*]~~

R325.5017. Definitions Se to So.

Rule 17. (1) ~~"Sealed source" means radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent release and dispersal of the radioactive material under the most severe conditions which are likely to be encountered in normal use and handling.~~ "Scan" means the complete process of collecting x-ray transmission data for the production of a tomogram. Data may be collected simultaneously during a single scan for the production of one or more tomograms.

(2) "Scan time" means the period of time between the beginning and end of x-ray transmission data accumulation for a single scan.

(3) "Scattered radiation" means radiation that, during passage through matter, has been deviated in direction.

~~(2)~~**(4)** "Secondary protective barrier" means the material placed in the path of scattered and leakage radiation to reduce the radiation exposure for protection purposes.

~~(3)~~**(5)** "Shall" means required to comply with these rules pursuant to the act and enforceable under the act and Act No. 306 of the Public Acts of 1969 as amended.

(6) "Shallow-dose equivalent" means the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm^2) averaged over an area of 1 square centimeter and applies to the external exposure of the skin or an extremity.

~~(4)~~**(7)** "Should" means recommended when practicable to meet optimum radiation safety standards.

(8) "SI" is the abbreviation for the international system of units.

(9) "Sievert" means the si unit of any of the quantities expressed as dose equivalent. the dose equivalent in sievert is equal to the absorbed dose in gray multipled by the quality factor (1 Sv = 100 rem).

(10) "Simulator (radiation therapy simulation system)" means any x-ray system intended for localizing the volume to be exposed during radiation therapy and reproducing the position and size of the therapeutic irradiation field.

~~(5)~~**(11)** "Source" as applied to x-ray means the focal spot of the x-ray tube.

~~(6)~~(12) "Source-image receptor distance" or "SID" means the distance from the source to the center of the input surface of the image receptor.

(13) "Source-skin" distance (SSD) means the distance from the source to the center of the entrant x-ray field in the plane tangent to the patient skin surface.

~~**(7)** "Source material" means uranium or thorium, or any combination thereof, in any physical or chemical form; or ores which contain by weight 1/20 of 1% (0.05%) or more of uranium, thorium or any combination thereof. Source material does not include special nuclear material.~~

~~(8)~~(14) "Source of radiation" means ~~any radioactive material, or~~ any device or equipment emitting or capable of producing radiation.

(15) "Solid-state x-ray imaging device" means an assembly, typically in a rectangular panel configuration, consisting of:

(a) a transducer layer that intercepts x-ray photons and through a single or multistage process converts the photon energy into a modulated signal representative of the x-ray image, and

(b) a matrix of integration and switching elements that are coupled to the transducer layer. an electrical signal representing the x-ray image is generated by a charge generation and transfer process within the integration and switching matrix. The electrical signals may undergo analog-to-digital conversion before leaving the panel to provide either a digital radiographic or fluoroscopic image.

~~[*Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.*]~~

R325.5018. Definitions Sp to Su.

Rule 18. (1) ~~"Special nuclear material in quantities not sufficient to form a critical mass" means uranium enriched in the isotope U-235 in quantities not exceeding 350 grams of contained U-235; uranium-233 in~~

~~quantities not exceeding 200 grams; plutonium in quantities not exceeding 200 grams; or any combination of them in accordance with the following formula: For each kind of special nuclear material, determine the ratio between the quantity of that special nuclear material and the quantity specified above for the same kind of special nuclear material. The sum of the ratios for all of the kinds of special nuclear material in combination shall not exceed "1" (i.e., unity). For example, the following quantities in combination would not exceed the limitation and are within the formula:~~

$$\frac{175 \text{ (grams contained U-235)}}{350} + \frac{\text{(grams U-233)}}{200} + \frac{\text{(grams Pu)}}{200} = 1$$

~~"Spot-film~~ device" means a device intended to transport and/or position a radiographic image receptor between the x-ray source and fluoroscopic image receptor. It includes a device intended to hold a cassette over the input end of the fluoroscopic image receptor for the purpose of producing a radiograph.

(2) "Stationary equipment" means equipment which is installed in a fixed location.

(3) "Storage" means a condition in which a machine or device is not being used for an extended period of time and has been made inoperable.

~~(3)~~(4) "Survey" means ~~a critical evaluation of a facility or area incident to the production, use, release, disposal, or presence of sources of radiation under a specific set of conditions to determine actual or potential radiation hazards. When appropriate, the evaluation includes tests, physical examination, source inventory and accountability, and measurements of levels of radiation or concentration of radioactive material present.~~an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radiation machines. When appropriate, such evaluation includes, but is not limited to, tests, physical examinations, and measurements of levels of radiation present.

~~[*Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.*]~~

R325.5019. Definitions T.

Rule 19. (1) "Technique factors" means ~~the conditions of operation. They are specific as follows:~~

~~**(A)** For the capacitor energy storage equipment, peak tube potential in kV, and quantity of charge in mAs.~~

~~**(B)** For field emission equipment rated for pulsed operation, peak tube potential in kV, and number of x-ray pulses.~~

~~**(C)** For all other equipment, peak tube potential in kV, and either tube current in mA and exposure time in seconds or the product of tube current and exposure time in mAs.~~the following:

(a) for capacitor energy storage equipment, peak tube potential in kilovolts (kV) and quantity of charge in milliamperes-seconds (mAs);

(b) for field emission equipment rated for pulsed operation, peak tube potential in kV and number of x-ray pulses;

(c) for CT equipment designed for pulsed operation, peak tube potential in kV, scan time in seconds, and either tube current in milliamperes (mA), x-ray pulse width in seconds, and the number of x-ray pulses per scan, or the product of the tube current, x-ray pulse width, and the number of x-ray pulses in mAs;

(d) for CT equipment not designed for pulsed operation, peak tube potential in kV, and either tube current in ma and scan time in seconds, or the product of tube current and exposure time in mAs and the scan time when the scan time and exposure time are equivalent; and

(e) for all other equipment, peak tube potential in kV, and either tube current in mA and exposure time in seconds, or the product of tube current and exposure time in mAs.

(2) "Test" means ~~a procedure for determining the characteristics or condition of a source of radiation, or circumstances relative thereto.~~ the process of verifying compliance with an applicable regulation.

(3) "Therapeutic type tube housing" means:

(a) For x-ray therapy equipment not capable of operating at 500 kVp or above, an x-ray tube housing so constructed that the leakage radiation averaged over any 100 cm^2 area at a distance of 1 meter from the source does not exceed 8.8mGy per hour(1 roentgen per hour) when the tube is operated at its leakage technique factors.

(b) For x-ray therapy equipment capable of operation at 500 kVp or above, an x-ray tube housing so constructed that the leakage radiation averaged over any 100 cm^2 area at a distance of 1 meter from the source does not exceed 0.1% of the useful beam dose rate at 1 meter from the source for any of its operating conditions.

(4) "Thermoluminescent dosimeter" or "TLD" means a device used for radiation monitoring which measures integrated dose by the principle of thermoluminescence.

(5) "These rules" means all parts.

(6) "Tube" means an x-ray tube, unless otherwise specified.

(7) "Tube housing assembly" means the tube housing with tube installed. It includes high-voltage or filament transformers and other appropriate elements when they are contained within the tube housing.

(8) "Tube rating chart" means the set of curves which specify the rated limits of operation of the tube in terms of the technique factors.

(9) “Type 1100 aluminum alloy” means aluminum that has a nominal chemical composition of 99.00 percent minimum aluminum and 0.12 percent copper.

R325.5020. Definitions U ~~and V.~~to W

Rule 20. (1) ~~"Unrefined and unprocessed ore" means ore in its natural form before any processing, such as grinding, roasting, beneficiating or refining.~~

~~**(2)** "Unrestricted area" or "uncontrolled area" means an area access to which is not controlled by a licensee or registrant for purposes of protection of individuals from exposure to radiation or radioactive materials, or an area used for residential quarters.~~ "Unrestricted area" means an area, access to which is neither limited nor controlled by the registrant.

~~**(3)**~~**(2)** "Useful beam" means the radiation which passes through the tube housing port and the aperture of the beam-limiting device when the exposure switch or timer is activated.

~~**(4)**~~**(3)** "Variable-aperture beam-limiting device" means a beam-limiting device which has capacity for stepless adjustment of the x-ray field size at a given source-image receptor distance.

(4) **"**Very high radiation area" means an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 5 gray (500 rads) in 1 hour at 1 meter from a radiation source or 1 meter from any surface that the radiation penetrates. Note: At very high doses received at high dose rates, units of absorbed dose (e.g., rads and grays) are appropriate, rather than units of dose equivalent (e.g., rems and sieverts)).

(5) "Visible area" means that portion of the input surface of the image receptor over which incident x-ray photons produce a visible image.

(6) "Wedge filter" means a filter which effects continuous change in transmission over all or a part of the useful beam.

(7) "Week" means 7 consecutive days starting on sunday.

~~[*Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.*]~~

R325.5021. Definitions X~~-ray~~ to Y.

Rule 21. (1) "X-ray apparatus" means any source of x-ray and its high voltage supply.

(2) "X-ray control" ~~means a device which controls input power to the x-ray high-voltage generator or the x-ray tube or both. It includes equipment which controls the technique factors of any x-ray exposure.~~ means a device which controls input power to the x-ray high-voltage generator and/or the x-ray tube. It includes equipment such as timers, phototimers, automatic brightness stabilizers, and similar devices, which control the technique factors of an x-ray exposure.

(3) "X-ray equipment" means an x-ray system, subsystem or component thereof. Types of x-ray equipment are as follows:

(a) "mobile x-ray equipment" means x-ray equipment mounted on a permanent base with wheels and/or casters for moving while completely assembled.

(b) "portable x-ray equipment" means x-ray equipment designed to be hand-carried.

(c) "stationary x-ray equipment" means x-ray equipment which is installed in a fixed location.

(d) "transportable x-ray equipment" means x-ray equipment which is moved to different work sites by vehicle and may be used in a mobile or stationary method at the site.

(4) "X-ray field" means that area of the intersection of the useful beam and any 1 of the set of planes parallel to and including the plane of the image receptor, whose perimeter is the locus of points at which the exposure rate is 1/4 of the maximum in the intersection.

(5) "X-ray high-voltage generator" means a device which transforms electrical energy from the potential supplied by the x-ray control to the tube operating potential. The device may include means for transforming

alternating current to direct current, filament transformers for the x-ray tubes, high-voltage switches, electrical protective devices and other appropriate elements.

(6) "X-ray system" means an assemblage of components for the controlled production of x-rays. It includes minimally an x-ray high-voltage generator, an x-ray control, a tube housing assembly, a beam-limiting device, and the necessary supporting structures. Additional components which function with the system are considered integral parts of the system.

(7) "X-ray subsystem" means any combination of 2 or more components of an x-ray system for which there are requirements specified in these rules.

(8) "X-ray tube" means any electron tube which is designed for the conversion of electrical energy into x-ray energy.

(9) "Year" means the period of time beginning in January used to determine compliance with the provisions of these regulations. The registrant may change the starting date of the year used to determine compliance by the registrant provided that the change is made at the beginning of the year and that no day is omitted or duplicated in consecutive years.

R325.5025. Prefixes.

Rule 25. The following prefixes are used in these rules to mean the numbers indicated:

Symbol	Prefix	Quantity	Symbol	Prefix	Quantity
d	deci	$(=10^{-1})$	da	deka	$(=10)$
c	centi	$(=10^{-2})$	h	hecto	$(=10^{2})$
m	milli	$(=10^{-3})$	k	kilo	$(=10^{3})$
µ	micro	$(=10^{-6})$	M	mega	$(=10^{6})$
p	nano	$(=10^{-9})$	G	giga	$(=10^{9})$
f	pico	$(=10^{-12})$	T	tera	$(=10^{12})$
a	femto	$(=10^{-15})$			
	atto	$(=10^{-18})$			

~~[*Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.*]~~

EXEMPTIONS

R325.5031. Departmental action.

Rule 31. Upon application therefore or upon its own initiative, the department may grant such exemptions or exceptions from the requirements of these rules as it determines are authorized by law and will not result in undue hazard to public health and safety or property.

~~**R325.5033. Nuclear regulatory commission contractors.**~~

~~**Rule 33.** An NRC contractor or subcontractor of the following categories operating in this state is exempt from these rules to the extent that the contractor or subcontractor under his contract receives, acquires, possesses, uses or transfers sources of radiation:~~

~~**(a)** A prime contractor performing work for the NRC at United States government-owned or controlled sites.~~

~~**(b)** A prime contractor performing research in, or development, manufacture, storage, testing or transportation of, atomic weapons or components thereof.~~

~~**(c)** A prime contractor using or operating nuclear reactors or other nuclear devices in a United States government-owned vehicle or vessel.~~

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

~~[*Note: The requirements of this rule that pertain to radiation machine registration, licensing, or compliance are under the purview of the Michigan Department of Consumer & Industry Services.*]~~

RECORDS, INSPECTIONS, TESTS AND ENFORCEMENT

R325.5041. Records.

Rule 41. A ~~licensee or~~ registrant shall keep records showing the receipt, transfer and disposal of all ~~sources of~~ radiation machines. Additional record requirements are specified elsewhere in these rules.

R325.5042. Inspections.

Rule 42. (1) Under authority of section 5(1) of the act, the department may enter at all reasonable times upon private or public property to conduct compliance investigations.

(2) Under authority of section 5(2) of the act, the department may obtain a warrant if necessary for search of property or seizure of ~~sources of~~ radiation machines or evidence of a violation of the act or any rule ~~or license~~.

(3) A ~~licensee or~~ registrant shall make available to the department for inspection, all records maintained pursuant to these rules.

R325.5043. Impounding.

Rule 43. ~~Sources of r~~Radiation machines are subject to impounding pursuant to section 5 of the act.

R325.5044. Tests.

Rule 44. A ~~licensee or~~ registrant shall perform upon instructions from the department and shall permit the department to perform such reasonable tests as the department deems appropriate or necessary including tests of:

(a) ~~Sources of r~~Radiation machines.

(b) Facilities wherein ~~sources of~~ radiation machines are used or stored.

(c) Radiation detection and monitoring instruments.

(d) Other equipment and devices used in connection with utilization ~~or storage~~ of ~~licensed or~~ registered ~~sources of~~ radiation machines.

R325.5045. Additional requirements.

Rule 45. The department, by rule or order, may impose upon a ~~licensee or~~ registrant requirements in addition to those set forth in these rules that it deems appropriate or necessary to minimize danger to public health and safety or property.

R325.5046. Violations.

Rule 46. (1) Under authority of section ~~9~~ 13536 of the act the department may seek a court order enjoining violation of or directing compliance with the act or any rule or order issued thereunder.

(2) Under authority of section ~~10~~ 13535 of the act, a person who performs any act for which ~~licensing or~~ registration is required pursuant to these rules when that person is not ~~licensed,~~ registered, or exempted, is guilty of a misdemeanor and may be fined, imprisoned or both. ~~This provision shall not be effective until 90 days after the effective date of these rules.~~

R325.5047. Communications.

Rule 47. Communications and reports concerning these rules, and applications filed thereunder, should be addressed to the Michigan Department of ~~Public Health, Division of Radiological Health, 3423 North Logan Street, P.O. Box 30195, Lansing, Michigan 48909.~~ Community Health, BHS, Radiation Safety Section, P.O. Box 30664, Lansing, Michigan 48909.

~~[*Note: As a result of Executive Orders 1996-1 and 1996-2, the authority, powers, duties, functions, and responsibilities of the radiation machine registration, licensing, and compliance program were transferred to the Michigan Department of Consumer & Industry Services. With respect to machine sources of ionizing radiation, any correspondence to the Michigan Department of Public Health should now be addressed to the Michigan Department of Consumer & Industry Services, BHS, Radiation Safety Section, P.O. Box 30664, Lansing, Michigan 48909.*]~~

~~**R325.5049. Rescission.**~~

~~**Rule 49.** The rules of the department entitled "Use of Radioactive Isotopes, X-radiation and All Other Forms of Ionizing Radiation," being R325.1301 to R325.1326 of the Michigan Administrative Code and appearing on pages 3173 to 3203 of the 1964-65 Annual Supplements to the Code, are rescinded.~~