

*April 24, 2000
Kentucky Regulations*

1 CABINET FOR HEALTH SERVICES
2 DEPARTMENT FOR PUBLIC HEALTH
3 DIVISION OF PUBLIC HEALTH PROTECTION AND SAFETY

4 (Amendment)

5 902 KAR 100:010. Definitions.

6 RELATES TO: KRS 211.842 to 211.852, 211.990(4), 10 CFR 20.1003-20.1005

7 STATUTORY AUTHORITY: KRS 194A.050, 211.090, 211.844, 10 CFR 20.1003-
8 20.1005

9 NECESSITY, FUNCTION, AND CONFORMITY: KRS 211.844 authorizes the Cabinet
10 for Health Services to provide by administrative regulation for the registration and
11 licensing of the possession or use of sources of ionizing or electronic product radiation
12 and the handling and disposal of radioactive waste. This administrative regulation
13 provides definitions as applicable to 902 KAR Chapters 100 and 105.

14 Section 1. Definitions. As used in these administrative regulations, these terms
15 have the definitions set forth below:

16 (1) "A₁" and "A₂."

17 (a) "A₁" means the maximum activity of special form radioactive material
18 permitted in a Type A package;

19 (b) "A₂" means the maximum activity of radioactive material, other than
20 special form radioactive material, permitted in a Type A package;

1 (c) These values are listed in 902 KAR 100:070, Section 21, or may be derived
2 under the procedure prescribed in 902 KAR 100:070, Section 20.

3 (2) "Absorbed dose" means the energy imparted by ionizing radiation per unit
4 mass of irradiated material. The units of absorbed dose are the rad and the gray (Gy).

5 (3) "Accelerator" means a machine capable of accelerating electrons, protons,
6 deuterons, or other charged particles in a vacuum and of discharging the resultant
7 particulate or other radiation into a medium at energies usually in excess of one (1)
8 MeV, such as the cyclotron, synchrotron, synchrocyclotron, betatron, linear accelerator,
9 and Van de Graaff electrostatic generator.

10 (4) "Accessible surface" means the external surface of the enclosure or housing
11 provided by the manufacturer.

12 (5) "Act" means KRS 211.842 to 211.852.

13 (6) "Activity" means the rate of disintegration (transformation) or decay of
14 radioactive material. The units of activity are the curie (Ci) and the becquerel (Bq).

15 (7) "Address of use" means the building or buildings that are identified on the
16 license and where radioactive material may be received, used or stored.

17 (8) "Adult" means an individual eighteen (18) or more years of age.

18 (9) "Agreement state" means a state with which the United States Nuclear
19 Regulatory Commission or the United States Atomic Energy Commission has entered
20 into an effective agreement under subsection 274 b. of the Atomic Energy Act of 1954,
21 as amended (73 Stat. 689).

22 (10) "Airborne radioactive material" means radioactive material dispersed in the
23 air in the form of dusts, fumes, particulates, mists, vapors, or gases.

1 (11) "Airborne radioactivity area" means a room, enclosure, or area in which
2 airborne radioactive material, composed wholly or partly of radioactive material, exists in
3 concentrations:

4 (a) In excess of the derived air concentrations (DACs) specified in 902 KAR
5 100:019, Section 44; or

6 (b) To a degree that an individual is present in the area without respiratory
7 protective equipment may exceed during the hours an individual is present in a week,
8 an intake of six-tenths (0.6) percent of the annual limit on intake (ALI) or twelve (12)
9 DAC-hours.

10 (12) "Alert" means events may occur, are in progress, or have occurred that
11 could lead to a release of radioactive material but that the release is not expected to
12 require a response by offsite response organizations to protect persons offsite.

13 (13) [(12)] "Aluminum equivalent" means the thickness of type 1100 (ninety-nine
14 (99.0) percent minimum aluminum, 0.12 percent copper) aluminum affording the same
15 attenuation, under specified conditions, as the material in question.

16 (14) [(13)] "Analytical x-ray systems" means a system which utilizes x-rays for the
17 examination of the structure of materials, such as x-ray diffraction and spectrographic
18 equipment.

19 (15) [(14)] "Annual limit on intake (ALI)" means the derived limit for the amount of
20 radioactive material taken into the body of an adult worker by inhalation or ingestion in a
21 year. ALI is the smaller value of intake of a given radionuclide in a year by the reference
22 man that would result in a committed effective dose equivalent of five (5) rems (0.05 Sv)
23 or a committed dose equivalent of fifty (50) rems (five-tenths (0.5) Sv) to an individual

1 organ or tissue. (ALI values for intake by ingestion and by inhalation of selected
2 radionuclides are given in 902 KAR 100:019, Section 44, Table I, Columns 1 and 2.)

3 (16) [~~(15)~~] "Area of use" means a portion of a physical structure that has been set
4 aside for the purpose of receiving, using or storing radioactive material.

5 (17) [~~(16)~~] "As low as reasonably achievable (ALARA)" means making every
6 reasonable effort to maintain exposures to radiation as far below the dose limits in 902
7 KAR 100:019 as practical, consistent with the purpose for which the licensed activity is
8 undertaken. ALARA shall take into account the state of technology, the economics of
9 improvement in relation to benefits to the public health and safety, and other societal
10 and socioeconomic considerations, in relation to the utilization of nuclear energy and
11 radioactive materials in the public interest.

12 (18) [~~(17)~~] "Attenuation" means the reduction of exposure rate upon passages of
13 radiation through matter.

14 (19) [~~(18)~~] "Attenuation block" means a block or stack, having dimensions twenty
15 (20) cm by twenty (20) cm by three and eight-tenths (3.8) cm, of type 1100 aluminum
16 alloy or other materials having equivalent attenuation.

17 (20) [~~(19)~~] "Authorized nuclear pharmacist" means a pharmacist who is:

18 (a) Board certified as a nuclear pharmacist by the Board of Pharmaceutical
19 Specialities; or

20 (b) Identified as an authorized nuclear pharmacist on a cabinet, Agreement
21 State or U.S. Nuclear Regulatory license that authorizes the use of radioactive material
22 in the practice of nuclear pharmacy.

23 (21) [~~(20)~~] "Automatic exposure control" means a device which automatically

1 controls one (1) or more technique factors in order to obtain at a preselected location a
2 required quantity of radiation.

3 (22) [~~(21)~~] "Authorized user" means a physician, dentist, or podiatrist, identified
4 as an authorized user on a cabinet, U.S. Nuclear Regulatory Commission, or another
5 agreement state license that authorizes the medical use of radioactive material.

6 (23) [~~(22)~~] "Background radiation" means radiation from cosmic sources,
7 naturally occurring radioactive materials, including radon (except as a decay product of
8 source or special nuclear material), and global fallout as it exists in the environment
9 from the testing of nuclear explosive devices or from past nuclear accidents such as
10 Chernobyl that contribute to background radiation and are not under the control of the
11 license. Background radiation shall not include radiation from radioactive materials
12 regulated by the Cabinet for Human Resources.

13 (24) [~~(23)~~] "Beam axis" means a line from the source through the centers of the
14 x-ray fields.

15 (25) [~~(24)~~] "Beam limiting device" (collimator) means a device which provides a
16 means to restrict the dimensions of the x-ray field.

17 (26) [~~(25)~~] "Beam monitoring system" means a system designed to detect and
18 measure the radiation present in the useful beam.

19 (27) [~~(26)~~] "Becquerel" means a unit, in the International System of Units (SI), of
20 measurement of radioactivity equal to one (1) transformation per second.

21 (28) [~~(27)~~] "Bioassay (radiobioassay)" means the determination of kinds,
22 quantities or concentrations, and, in some cases, the locations of radioactive material in
23 the human body, by direct measurement (in vivo counting) or by analysis and evaluation

1 of materials excreted or removed from the human body.

2 (29) [~~(28)~~] "Brachytherapy" means a method of radiation therapy in which an
3 encapsulated source or group of sources is utilized to deliver radiation at a distance of
4 up to a few centimeters, by surface, intracavitary, or interstitial application.

5 (30) [~~(29)~~] "Broker" (waste broker) means a person who takes possession of low-
6 level waste solely for the purposes of consolidation and shipment.

7 (31) [~~(30)~~] "By-product material" means:

8 (a) Radioactive material (except special nuclear material) yielded in or made
9 radioactive by exposure to the radiation incident to the process of producing or utilizing
10 special nuclear material; or [~~and~~]

11 (b) The tailings or wastes produced by the extraction or concentration of
12 uranium or thorium from ore processed primarily for its source material content,
13 including discrete surface wastes resulting from uranium solution extraction processes.
14 Underground ore bodies depleted by these solution extraction operations shall not
15 constitute by-product material within this definition.

16 (32) [~~(31)~~] "Cabinet" means Cabinet for Human Resources, or its duly authorized
17 representatives.

18 (33) [~~(32)~~] "Cabinet radiography" means industrial radiography conducted in an
19 enclosure or cabinet shielded so that radiation levels at every location on the exterior
20 meet the limitations specified in 902 KAR 100:019, Section 11.

21 (34) [~~(33)~~] "Cabinet x-ray systems" means an x-ray system with the x-ray tube
22 installed or used in a permanent enclosure in which the enclosure is intended to contain
23 at least that portion of the material being irradiated. The enclosure may be the

1 architectural structure or may be independent of the architectural structure, but
2 regardless, the structure of the enclosure shall provide attenuation of the radiation to
3 meet the requirements of 902 KAR 100:105, relating to the possession, use, and
4 operation of x-ray systems, and shall exclude personnel from its interior during the
5 generation of x-radiation. This definition shall not include x-ray systems used by
6 licensed practitioners of the healing arts.

7 (35) [~~(34)~~] "Calendar quarter" means not less than twelve (12) consecutive weeks
8 nor more than fourteen (14) consecutive weeks. The first calendar quarter of each year
9 shall begin in January and subsequent calendar quarters shall be arranged so that no
10 day is included in more than one (1) calendar quarter and no day in a one (1) year
11 period is omitted from inclusion within a calendar quarter. No licensee or registrant shall
12 change the method observed of determining calendar quarters except at the beginning
13 of a calendar year.

14 (36) [~~(35)~~] "Calibration" means the determination of:

15 (a) The response or reading of an instrument relative to a series of known
16 radiation values over the range of the instrument; or

17 (b) The strength of a source of radiation relative to a standard.

18 (37) [~~(36)~~] "Carrier" means a person engaged in the transportation of passengers
19 or property by land or water as a common, contract, or private carrier, or by civil aircraft.

20 (38) [~~(37)~~] "Cephalometric device" means a device intended for the radiographic
21 visualization and measurement of the dimensions of the human head.

22 (39) [~~(38)~~] "Certified cabinet x-ray system" means an x-ray system which has
23 been certified under 21 CFR 1010.2 as being manufactured and assembled according

1 to the provisions of 21 CFR 1020.40.

2 (40) [~~(39)~~] "Certified components" means components of x-ray systems which
3 shall be subject to regulations promulgated under 21 CFR Subchapter J.

4 (41) [~~(40)~~] "Certified system" means an x-ray system which has one (1) or more
5 certified component.

6 (42) [~~(41)~~] "CFR" means Code of Federal Regulations.

7 (43) [~~(42)~~] "Changeable filters" means a filter, exclusive of inherent filtration,
8 which can be removed from the useful beam through an electronic, mechanical, or
9 physical process.

10 (44) [~~(43)~~] "Class (or lung class or inhalation class)" means a classification
11 scheme for inhaled material according to its rate of clearance from the pulmonary region
12 of the lung. Materials shall be classified as D, W, or Y, which applies to a range of
13 clearance half-times: for Class D (Days) of less than ten (10) days, and for Class W
14 (Weeks) from ten (10) to 100 days, and for Class Y (Years) of greater than 100 days.

15 (45) [~~(44)~~] "Collective dose" means the sum of the individual doses received in a
16 given period of time by a specified population from exposure to a specified source of
17 radiation.

18 (46) [~~(45)~~] "Collimator" means a device used to limit the size, shape, and
19 direction of the primary radiation beam.

20 (47) [~~(46)~~] "Commission" means the Nuclear Regulatory Commission or its duly
21 authorized representatives.

22 (48) [~~(47)~~] "Committed dose equivalent ($H_{T,50}$)" means the dose equivalent to
23 organs or tissues of reference (T) that will be received from an intake of radioactive

1 material by an individual during the fifty (50) year period following the intake.

2 (49) [(48)] "Committed effective dose equivalent ($H_{E,50}$)" means the sum of the
3 products of the weighting factors applicable to each of the body organs or tissues that
4 are irradiated and the committed dose equivalent to these organs or tissues ($H_{E,50} = \sum$
5 $W_T H_{T,50}$).

6 (50) [(49)] "Computed tomography (CT)" means the production of a tomogram by
7 the acquisition and computer processing of x-ray transmission data.

8 (51) [(50)] "Constraint (dose constraint)" means a value above which specified
9 licensee actions are required.

10 (52) [(51)] "Contact therapy system" means an x-ray system used for therapy
11 with the x-ray tube port placed in contact with or within five (5) centimeters of the
12 surface being treated.

13 (53) [(52)] "Control panel" means that part of the x-ray control upon which are
14 mounted the switches, knobs, push buttons, and other hardware necessary for manually
15 setting the technique factors.

16 (54) [(53)] "Controlled area" means an area, outside of a restricted area but
17 inside the site boundary, to which access can be limited by the licensee or registrant for
18 a reason.

19 (55) [(54)] "Cooling curve" means the graphical relationship between heat units
20 stored and cooling time.

21 (56) "Critical group" means the group of individuals reasonably expected to
22 receive the greatest exposure to residual radioactivity for any applicable set of
23 circumstances.

1 (57) [(55)] "Curie" means a quantity of radioactivity. One (1) curie (Ci) is that
2 quantity of radioactive material which decays at the rate of 3.7×10^{10} disintegrations per
3 second (dps). Commonly used submultiples of the curie are the millicurie and the
4 microcurie. One (1) millicurie (mCi) = 0.001 curie = 3.7×10^7 dps. One (1) microcurie
5 (uCi) = 0.000001 curie = 3.7×10^4 dps.

6 (58) [(56)] "Dead man switch" means a switch so constructed that a circuit
7 closing contact can be maintained only by continuous pressure on the switch by the
8 operator.

9 (59) [(57)] "Declared pregnant woman" means a woman who has voluntarily
10 informed her employer, in writing, of her pregnancy and the estimated date of
11 conception.

12 (60) [(58)] "Decommission" means to remove, as a facility or site, safely from
13 service and reduce residual radioactivity to a level that permits:

14 (a) release of the property for unrestricted use and termination of license[-]; or

15 (b) release of the property under restricted conditions and termination of the
16 license.

17 (61) [(59)] "Dedicated check source" means a radioactive source that is used to
18 assure the constant operation of a radiation detection or measurement device over
19 several months or years. The source may also be used for other purposes.

20 (62) [(60)] "Deep-dose equivalent (H_d)" which applies to external whole-body
21 exposure, means the dose equivalent at a tissue depth of one (1) centimeter (cm) (1000
22 mg/cm^2).

23 [(61)] "Depleted uranium" means the source material uranium in which the isotope

1 uranium-235 is less than 0.711 weight percent of the total uranium present. Depleted
2 uranium does not include special nuclear material.]

3 (63) [(62)] "Derived air concentration (DAC)" means the concentration of a given
4 radionuclide in air which, if breathed by the reference man for a working year of 2,000
5 hours under conditions of light work (inhalation rate one and two-tenths (1.2) cubic
6 meters of air per hour), results in an intake of one (1) ALI. DAC values are given in 902
7 KAR 100:019, Section 44, Table I, Column 3.

8 (64) [(63)] "Derived air concentration-hour (DAC-hour)" means the product of the
9 concentration of radioactive material in air (expressed as a fraction or multiple of the
10 derived air concentration for each radionuclide) and the time of exposure to that
11 radionuclide, in hours. A licensee may take 2,000 DAC-hours to represent one (1) ALI,
12 equivalent to a committed effective dose equivalent of five (5) rems (0.05 Sv).

13 (65) [(64)] "Diagnostic clinical procedure manual" means a collection of written
14 procedures that describes each method, and other instructions and precautions, by
15 which the licensee performs diagnostic clinical procedures where each diagnostic
16 clinical procedure has been approved by the authorized user and includes the
17 radiopharmaceutical, dosage, and route of administration.

18 (66) [(65)] "Diagnostic source assembly" means the tube housing assembly with
19 a beam-limiting device attached.

20 (67) [(66)] "Diagnostic-type protective tube housing" means an x-ray tube
21 housing so constructed that the leakage radiation measured at a distance of one (1)
22 meter from the source cannot exceed 100 milliroentgens in one (1) hour if the tube is
23 operated at its maximum continuous rated current for the maximum tube potential.

1 (68) [(67)] "Diagnostic x-ray system" means an x-ray system designed for
2 irradiation of a part of the human body for the purpose of diagnosis or visualization.

3 (69) [(68)] "Direct scatter radiation" means that scattered radiation which has
4 been deviated in direction only by materials irradiated by the useful beam. (See also
5 "scattered radiation").

6 (70) [(69)] "Disposal" means the disposition of waste as authorized by 902 KAR
7 100:021.

8 (71) "Distinguishable from background" means that the detectable concentration
9 of a radionuclide is statistically different from the background concentrations of that
10 radionuclide in the vicinity of the site or, in the case of structures, in similar materials
11 using adequate measurements technology, survey, and statistical techniques.

12 (72) [(70)] "Dose" or "radiation dose" is a generic term that means absorbed
13 dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed
14 effective dose equivalent, or total effective dose equivalent.

15 (73) [(71)] "Dose commitment" means the total radiation dose to a part of the
16 body that results from retention in the body of radioactive material. For purposes of
17 estimating the dose commitment, it is assumed that from the time of intake the period of
18 exposure to retained material shall not exceed fifty (50) years.

19 (74) [(72)] "Dose equivalent (H_T)" means the product of the absorbed dose in
20 tissue, quality factor, and other necessary modifying factors at the location of interest.
21 The units of dose equivalent are the rem and sievert (Sv).

22 (75) [(73)] "Dosimetry processor" means an individual or an organization that
23 processes and evaluates individual monitoring equipment in order to determine the

1 radiation dose delivered to the equipment.

2 (76) [(74)] "Effective dose equivalent (H_E)" means the sum of the products of the
3 dose equivalent to the organ or tissue (H_T) and the weighting factors (W_T) applicable to
4 each of the body organs or tissues that are irradiated ($H_E = W_T H_T$).

5 (77) [(75)] "Embryo or fetus" means the developing human organism from
6 conception until the time of birth.

7 (78) [(76)] "Entrance or access point" means a location through which an
8 individual may gain access to radiation areas or to radioactive materials. This includes
9 entry or exit portals of sufficient size to permit human entry, irrespective of their
10 intended use.

11 (79) [(77)] "Entrance exposure rate" means the roentgens per unit time at the
12 point the center of the useful beam enters the patient.

13 (80) [(78)] "Exclusive use" [~~also referred to in other administrative regulations as~~
14 ~~"sole use" or "full load"~~] means: (a) the sole use of a conveyance by a single consignor
15 in which initial, intermediate, and final loading and unloading are carried out under the
16 direction of the consignor or consignee;[-]

17 (b) the consignor and the carrier must ensure that any loading or unloading is
18 performed by personnel having radiological training and resources appropriate for safe
19 handling of the consignment; and

20 (c) the consignor must issue specific instructions, in writing, for maintenance of
21 exclusive use shipment controls, and include them with the shipping paper information
22 provided to the carrier by the consignor.

23 (81) [(79)] "Exposure" means being exposed to ionizing radiation or to

1 radioactive material.

2 (82) [~~(80)~~] "Exposure rate" means the exposure per unit of time, such as
3 roentgen per minute and milliroentgen per hour.

4 (83) [~~(81)~~] "External dose" means that portion of the dose equivalent received
5 from radiation sources outside the body.

6 (84) [~~(82)~~] "Extremity" means hand, elbow, arm below the elbow, foot, knee, or
7 leg below the knee.

8 (85) [~~(83)~~] "Eye dose equivalent" means to the external exposure of the lens of
9 the eye and means the dose equivalent at a tissue depth of three-tenths (0.3)
10 centimeter (300 mg/cm²).

11 (86) [~~(84)~~] "Facility" means the location at which one (1) or more devices or
12 sources are installed or located within one (1) building, vehicle, or under one (1) roof
13 and are under the same administrative control.

14 (87) [~~(85)~~] "Field emission equipment" means equipment which uses an x-ray
15 tube in which electron emission from the cathode is due solely to the action of an
16 electric field.

17 (88) [~~(86)~~] "Field station" means a facility where radioactive sources may be
18 stored or used and from which equipment is dispatched to temporary job sites.

19 (89) [~~(87)~~] "Filter" means the material in the useful beam which usually absorbs
20 preferentially the less penetrating radiations.

21 (a) "Inherent filtration" means the filter permanently in the useful beam. It
22 includes the window of the x-ray tube and the permanent tube enclosure.

23 (b) "Added filter" means the filter added to the inherent filtration.

1 (c) "Total filter" means the sum of the inherent and added filters.

2 ~~(90) [(88)]~~ "Fissile material" means special nuclear material consisting of or
3 containing one (1) or more fissile radionuclides. Fissile radionuclides are plutonium-238,
4 plutonium-239, plutonium-241, uranium-233, and uranium-235. Unirradiated natural and
5 depleted uranium, and natural or depleted uranium that has been irradiated in thermal
6 reactors only are not included in this definition. [Neither natural or depleted uranium is
7 fissile material.] (Cabinet jurisdiction extends only to special nuclear material if
8 quantities are not sufficient to form a critical mass as defined in this administrative
9 regulation.)

10 ~~[(a) Fissile Class I: a package which may be transported in unlimited numbers~~
11 ~~and in an unspecified arrangement, and which requires no nuclear criticality safety~~
12 ~~controls during transportation. A transport index is not assigned for purposes of nuclear~~
13 ~~criticality safety, but may be required because of external radiation levels.~~

14 ~~(b) Fissile Class II: a package which may be transported together with other packages~~
15 ~~in an unspecified arrangement but, for criticality control, in numbers which do not~~
16 ~~exceed an aggregate transport index of fifty (50). These shipments require no other~~
17 ~~nuclear criticality safety control during transportation. Individual packages may have a~~
18 ~~transport index not less than 0.1 and not more than ten (10).]~~

19 (91) "Fissile material package" means a fissile material packaging together with
20 its fissile material contents.

21 (92) [(89)] "Fluoroscopic imaging assembly" means a component which
22 comprises a reception system in which x-ray photons produce a fluoroscopic image. It
23 includes equipment housings, electrical interlocks if present, the primary

1 protective barrier, and structural material providing linkage between the image receptor
2 and the diagnostic source assembly.

3 (93) [~~(90)~~] "Focal spot" means the area projected on the anode of the x-ray tube
4 by the electrons accelerated from the cathode and from which the useful beam
5 originates.

6 (94) [~~(91)~~] "Former U.S. Atomic Energy Commission (AEC) or U.S. Nuclear
7 Regulatory Commission (NRC) licensed facilities" means nuclear reactors, nuclear fuel
8 reprocessing plants, uranium enrichment plants, or critical mass experimental facilities
9 where AEC or NRC licenses have been terminated.

10 (95) [~~(92)~~] "General purpose radiographic x-ray system" means a radiographic x-
11 ray system which, by design, is not limited to radiographic examination of specific
12 anatomical regions.

13 (96) [~~(93)~~] "Generally applicable environmental radiation standards" means
14 standards issued by the Environmental Protection Agency (EPA) under the authority of
15 42 USC sec. 2011 et seq. that impose limits on radiation exposures or levels, or
16 concentrations or quantities of radioactive material, in the general environment outside
17 the boundaries of locations under the control of persons possessing or using radioactive
18 material.

19 (97) [~~(94)~~] "Generator" (waste generator) means a person who produces or
20 possesses low-level radioactive waste in the course of or incident to manufacturing,
21 power generation, processing, medical diagnosis and treatment, research, education or
22 other activity.

23 (98) [~~(95)~~] "Gonad shield" means a protective barrier for the testes or ovaries.

1 (99) [~~(96)~~] "Gray (Gy)" means the SI unit of absorbed dose. One (1) gray shall be
2 equal to an absorbed dose of one (1) Joule/kilogram (100 rads).

3 (100) [~~(97)~~] "Half-value layer (HVL)" means the thickness of specified material
4 which attenuates the beam of radiation to an extent that the exposure rate is reduced to
5 one-half (1/2) of its original value. In this definition, the contribution of scattered
6 radiation, other than that which might be present initially in the beam concerned, shall
7 be deemed to be excluded.

8 (101) [~~(98)~~] "Healing arts screening" means the testing of human beings using x-
9 ray machines for the detection or evaluation of health indications if these tests are not
10 specifically and individually ordered by a licensed practitioner of the healing arts legally
11 authorized to prescribe these x-ray tests for the purpose of diagnosis or treatment.

12 (102) [~~(99)~~] "Heat unit" means a unit of energy equal to the product of the peak
13 kilovoltage, milliamperes, and seconds, such as kVp x mA x seconds.

14 (103) [~~(400)~~] "High radiation area" means an area, accessible to individuals, in
15 which radiation levels may result in an individual receiving a dose equivalent in excess
16 of one-tenth (0.1) rem (1m Sv) in one (1) hour at thirty (30) centimeters from the
17 radiation source or from a surface that the radiation penetrates.

18 (104) [~~(401)~~] "Human use" means the internal or external administration of
19 radiation or radioactive materials to human beings.

20 (105) [~~(402)~~] "Image intensifier" means a device which converts instantaneously
21 by means of photoemissive surfaces and electronic circuitry an x-ray pattern into a light
22 pattern of greater intensity than would have been produced by the original x-ray pattern.

23 (106) [~~(403)~~] "Image receptor" means a device as a fluorescent screen or

1 radiographic film which transforms incident radiation into a visual image or into another
2 form which can be made into a visual image by further transformations.

3 (107) [~~(404)~~] "Image receptor support" means for mammographic systems, that
4 part of the system designed to support the image receptor in a horizontal plane during a
5 mammographic examination.

6 (108) [~~(405)~~] "Individual" means a human being.

7 (109) [~~(406)~~] "Individual monitoring" means the assessment of:

8 (a) Dose equivalent by the use of devices designed to be worn by an individual;

9 (b) Committed effective dose equivalent by bioassay (see bioassay) or by
10 determination of the time-weighted air concentrations to which an individual has been
11 exposed, such as DAC-hours; or

12 (c) Dose equivalent by the use of survey data.

13 (110) [~~(407)~~] "Individual monitoring devices (individual monitoring equipment)"
14 means devices designed to be worn by a single individual for the assessment of dose
15 equivalent, such as film badges, thermoluminescent dosimeters (TLDs), pocket
16 ionization chambers, and personal ("lapel") air sampling devices.

17 (111) [~~(408)~~] "Industrial radiography" means the examination of the macroscopic
18 structure of materials by nondestructive methods utilizing sources of radiation.

19 (112) [~~(409)~~] "Injection tool" means a device used for controlled subsurface
20 injection of radioactive tracer material.

21 (113) [~~(410)~~] "Inspection" means an examination or observation, such as tests,
22 surveys, and monitoring, to determine compliance with rules, administrative regulations,
23 orders, and requirements of the cabinet.

1 (114) [(111)] "Interlock" means a device arranged or connected so that the
2 occurrence of an event or condition is required before a second event or condition can
3 occur or continue to occur.

4 (115) [(112)] "Internal dose" means that portion of the dose equivalent received
5 from radioactive material taken into the body.

6 (116) [(113)] "Irradiation" means the exposure of matter to ionizing radiation.

7 (117) [(114)] "Kilovolt peak (kVp)" means the crest value in kilovolts of the
8 potential difference of a pulsating potential generator. If only one-half (1/2) of the wave
9 is used, the value refers to the useful half of the wave.

10 (118) [(115)] "Lead equivalent" means the thickness of lead affording the same
11 attenuation, under specified conditions, as the material in question.

12 (119) [(116)] "Leakage radiation" means radiation emanating from the diagnostic
13 or therapeutic source assembly except for the useful beam.

14 (120) [(117)] "Leakage technique factors" means the technique factors
15 associated with the tube housing assembly which are used in measuring leakage
16 radiation. They shall be defined as follows:

17 (a) For capacitor energy storage equipment, the maximum rated number of
18 exposures in an hour for operation at the maximum rated peak tube potential with the
19 quantity of charge per exposure being ten (10) milliamperere seconds (mAs) or the
20 minimum obtainable from the unit, whichever is larger.

21 (b) For field emission equipment rated for pulsed operation, the maximum rated
22 number of x-ray pulses in an hour for operation at the maximum rated peak tube
23 potential.

1 (c) For all other equipment, the maximum rated continuous tube current for the
2 maximum rated peak tube potential.

3 (121) "Lens dose equivalent (LDE)" means applies to the external exposure of
4 the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3
5 centimeter (300 mg/cm²).

6 (122) [(118)] "License" means a license issued by the cabinet under 902 KAR
7 Chapter 100.

8 (123) [(119)] "Licensed material" means radioactive material received,
9 possessed, used, transferred, or disposed under a general or specific license issued by
10 the cabinet under 902 KAR Chapter 100.

11 (124) [(120)] "Licensee" means the holder of a license.

12 (125) [(121)] "Limits (dose limits)" means the permissible upper bounds of
13 radiation doses.

14 (126) [(122)] "Lixiscope" means a portable light-intensified imaging device using
15 a sealed source.

16 (127) [(123)] "Logging assistant" means an individual who, under the personal
17 supervision of a logging supervisor, handles sealed sources or tracers that are not in
18 logging tools or shipping containers or who uses survey instruments in well-logging
19 activities.

20 (128) [(124)] "Logging supervisor" means the individual who provides personal
21 supervision of the utilization of sources of radiation at the well site.

22 (129) [(125)] "Logging tool" means a device used subsurface to perform well-
23 logging.

1 (130) [(426)] "Lost or missing licensed material" means licensed material whose
2 location is unknown. It includes material that has been shipped but has not reached its
3 destination and whose location cannot be readily traced in the transportation system.

4 (131) [(427)] "Low-level radioactive waste" means radioactive waste not
5 classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or by-
6 product material as defined in Section 11e(2) of the Atomic Energy Act of 1954 (42 USC
7 2014).

8 (132) [(428)] "Low specific activity (LSA) material" means radioactive material
9 with limited specific activity that satisfies the descriptions and limits set forth below.
10 Shielding materials surrounding the LSA material may not be considered in determining
11 the estimated average specific activity of the package contents. LSA material must be in
12 one (1) of three (3) groups:

13 (a) LSA-I:

14 1. Ores containing only naturally occurring radionuclides (e.g., uranium, thorium)
15 and uranium or thorium concentrates of such ores; or

16 2. Solid unirradiated natural or depleted uranium or natural thorium or their
17 solids or liquid compounds or mixtures; or

18 3. Radioactive material, other than fissile material, for which the A_2 value is
19 unlimited; or

20 4. Mill tailings, contaminated earth, concrete, rubble, other debris, and activated
21 material in which the radioactive material is essentially uniformly distributed, and the
22 average specific activity does not exceed 10^{-6} A_2 /gram.

23 (b) LSA-II:

1 1. Water with tritium concentration up to 20.0 Curies/liter (0.8 TBq/liter); or

2 2. Material in which the radioactive material is distributed throughout, and the
3 average specific activity does not exceed 10^{-4} A₂/gram for solids and gases, and 10^{-5}
4 A₂/gram for liquids.

5 (c) LSA-III: Solids (e.g., consolidated wastes, activated materials) in which:

6 1. the radioactive material is distributed throughout a solid or a collection of solid
7 objects, or

8 2. is essentially uniformly distributed in a solid compact binding agent (such as
9 concrete, bitumen, ceramic, etc.); and

10 3. the radioactive material is relatively insoluble, or it is intrinsically contained in
11 a relatively insoluble material, so that, even under loss of packaging, the loss of
12 radioactive material per package by leaching, when placed in water for seven (7) days,
13 would not exceed 0.1 A₂; and the average specific activity of the solid does not exceed
14 2×10^{-3} A₂/gram.

15 ~~[(a) Uranium or thorium ores and physical or chemical concentrates of those~~
16 ~~ores;~~

17 ~~(b) Unirradiated natural or depleted uranium or unirradiated natural thorium;~~

18 ~~(c) Tritium oxide in aqueous solutions provided the concentration does not~~
19 ~~exceed five (5.0) millicuries per milliliter; or~~

20 ~~(d) Material in which the radioactivity is essentially uniformly distributed and in~~
21 ~~which the estimated average concentration per gram of contents shall not exceed:~~

22 ~~1. 0.0001 millicurie of radionuclides for which the A₂ quantity in 902 KAR 100:070~~
23 ~~is not more than 0.05 curie;~~

1 2. 0.005 millicurie of radionuclides for which the A_2 quantity in 902 KAR 100:070
2 is more than 0.05 curie, but not more than one (1) curie; or

3 3. 0.3 millicurie of radionuclides for which the A_2 quantity in 902 KAR 100:070 is
4 more than one (1) curie; or

5 (e) ~~Objects of nonradioactive material externally contaminated with radioactive~~
6 ~~material, if the radioactive material is not readily dispersible and the surface~~
7 ~~contamination, averaged over an area of one (1) square meter, does not exceed 0.0001~~
8 ~~millicurie (220,000 disintegrations per minute) per square centimeter of radionuclides for~~
9 ~~which the A_2 quantity in 902 KAR 100:070 is not more than 0.05 curie, or 0.001~~
10 ~~millicurie (2,200,000 disintegrations per minute) per square centimeter for other~~
11 ~~radionuclides.]~~

12 (133) "Low toxicity alpha emitter" means natural uranium, depleted uranium,
13 natural thorium, uranium-235, uranium-238, thorium-232, thorium-228 or thorium-230
14 when contained in ores or physical or chemical concentrates or tailings; or alpha
15 emitters with a half-life of less than ten (10) days.

16 (134) [(129)] "mA" means milliamperere.

17 (135) [(130)] "Management" means the chief executive officer or that individual's
18 designee.

19 (136) [(131)] "mAs" means milliamperere second.

20 (137) "Maximum normal operating pressure" means the maximum gauge
21 pressure that would develop in the containment system in a period of one (1) year under
22 the heat condition specified in 10 C.F.R. Part 71.71(c)(1), in the absence of venting,
23 external cooling by an ancillary system, or operational controls during transport.

1 (138) [(432)] "Medical institution" means an organization in which several medical
2 disciplines are practiced.

3 (139) [(433)] "Medical use" means the intentional internal or external
4 administration of radioactive material, or the radiation therefrom, to patients or human
5 research subjects under the supervision of an authorized user.

6 (140) [(434)] "Member of the public" means an individual except when the
7 individual is receiving an occupational dose.

8 (141) [(435)] "Microscopic analytical x-ray equipment" means a device which
9 utilizes x-rays for examining the microscopic structure of materials. This includes x-ray
10 diffraction and spectographic equipment.

11 (142) [(436)] "Mineral logging" means logging performed for the purpose of
12 mineral exploration other than oil or gas.

13 (143) [(437)] "Minor" means an individual less than eighteen (18) years of age.

14 (144) [(438)] "Misadministration" means the administration of:

15 (a) A radiopharmaceutical dosage greater than thirty (30) microcuries of sodium
16 iodide I-125 or I-131:

17 1. Involving the wrong patient or human research subject or wrong
18 radiopharmaceutical; or

19 2. If both the administered dosage differs from the prescribed dosage by more
20 than twenty (20) percent of the prescribed dosage and the difference between the
21 administered dosage and prescribe dosage exceeds thirty (30) microcuries.

22 (b) A therapeutic radiopharmaceutical dosage, other than sodium iodide I-125 or
23 I-131:

1 1. Involving the wrong patient, or human research subject, radiopharmaceutical,
2 or route of administration; or

3 2. If the administered dosage differs from the prescribed dosage by more than
4 twenty (20) percent of the prescribed dosage.

5 (c) A gamma stereotactic radiosurgery radiation dose:

6 1. Involving the wrong patient or human research subject or treatment site; or

7 2. If the calculated total administered dose differs from the total prescribed dose
8 by more than ten (10) percent of the total prescribed dose.

9 (d) A teletherapy radiation dose:

10 1. Involving the wrong patient, or human research subject, mode of treatment, or
11 treatment site;

12 2. If the treatment consists of three (3) or fewer fractions and the calculated total
13 administered dose differs from the total prescribed dose by more than ten (10) percent
14 of the total prescribed dose;

15 3. If the calculated weekly administered dose is thirty (30) percent greater than
16 the weekly prescribed dose; or

17 4. If the calculated total administered dose differs from the total prescribed dose
18 by more than twenty (20) percent of the total prescribed dose.

19 (e) A brachytherapy radiation dose:

20 1. Involving the wrong patient or human research subject, radioisotope, or
21 treatment site (excluding permanent implant seeds that were implanted in the correct
22 site but migrated outside the treatment site);

23 2. Involving a sealed source that is leaking;

1 3. If, for a temporary implant, one (1) or more sealed sources are not removed
2 upon completion of the procedure; or

3 4. If the calculated administered dose differs from the prescribed dose by more
4 than twenty (20) percent of the prescribed dose.

5 (f) A diagnostic radiopharmaceutical dosage, other than quantities greater than
6 thirty (30) microcuries of sodium iodide I-125 or I-131:

7 1. Involving the wrong patient or human research subject, radiopharmaceutical,
8 route of administration, or if the administered dosage differs from the prescribed
9 dosage; and

10 2. If the dose to the patient or human research subject exceeds five (5) rems
11 effective dose equivalent or fifty (50) rems dose equivalent to an individual organ.

12 (145) [(139)] "Mobile nuclear medicine service" means the transportation and
13 medical use of radioactive material.

14 (146) [(140)] "Monitoring (radiation monitoring, radiation protection monitoring)"
15 means the measurement of radiation levels, concentrations, surface area
16 concentrations or quantities of radioactive material and the use of the results of these
17 measurements to evaluate potential exposures and doses.

18 (147) "Natural thorium" means thorium with the naturally occurring distribution of
19 thorium isotopes (essentially 100 weight percent thorium-232).

20 (148) [(141)] "Nonstochastic effect" means health effects, the severity of which
21 varies with the dose and for which a threshold is believed to exist. Radiation-induced
22 cataract formation is an example of a nonstochastic effect (also called a deterministic
23 effect).

1 (149) [~~(142)~~] "Normal form radioactive material" means radioactive material
2 which has not been demonstrated to quality as "special form radioactive material."

3 (150) [~~(143)~~] "NRC" means the Nuclear Regulatory Commission or its duly
4 authorized representatives.

5 (151) [~~(144)~~] "Occupational dose" means dose received by an individual in the
6 course of employment in which the individual's assigned duties for the licensee or
7 registrant involve exposure to sources of radiation, whether in the possession of the
8 licensee, registrant, or other person. Occupational dose shall not include dose received
9 from background radiation as a patient from medical practices, from voluntary
10 participation in medical research programs, as a member of the public or from exposure
11 to individuals administered radioactive material and released in accordance with 902
12 KAR 100:073, Section 25.

13 (152) [~~(145)~~] "Output" means the exposure rate, dose rate, or a quantity related
14 in a known manner to these rates from a teletherapy unit for a specified set of exposure
15 conditions.

16 (153) [~~(146)~~] "Operating procedures" means detailed written instructions, such as
17 the normal operation of equipment and movable shielding, closing of interlock circuits,
18 manipulation of controls, radiation monitoring procedures for personnel and areas,
19 testing of interlocks, and recordkeeping requirements.

20 (154) [~~(147)~~] "Package" means the packaging together with its radioactive
21 contents as presented for transport.

22 (155) [~~(148)~~] "Packaging" means the assembly of components necessary to
23 ensure compliance with the packaging requirements of 902 KAR 100:070. It may

1 consist of one (1) or more receptacles, absorbent materials, spacing structures, thermal
2 insulation, radiation shielding, and devices for cooling or absorbing mechanical shocks.
3 The vehicle, tie-down system, and auxiliary equipment may be designated as part of the
4 packaging.

5 (156) [~~(149)~~] "Patient" means an individual subjected to healing arts examination,
6 diagnosis, or treatment.

7 (157) [~~(150)~~] "Peak tube potential" means the maximum value of the potential
8 difference across the x-ray tube during an exposure.

9 (158) [~~(151)~~] "Permanent radiographic installation" means an installation or
10 structure designed or intended for radiography and in which radiography is regularly
11 performed.

12 (159) [~~(152)~~] "Person" means an individual, corporation, partnership, firm,
13 association, trust, estate, public or private institution, group, agency, political subdivision
14 of this state or other state, or political subdivision or agency thereof, and a legal
15 successor, representative, agent or agency of the foregoing.

16 (160) [~~(153)~~] "Personal supervision" means guidance and instruction by the
17 supervisor who is physically present at the job site and watching the performance of the
18 operation in proximity so that contact can be maintained and immediate assistance
19 given as required.

20 (161) [~~(154)~~] "Personnel monitoring equipment" means a device designed to be
21 worn or carried by an individual for the purpose of estimating the dose received by the
22 individual, such as film badges, pocket dosimeters, and thermoluminescent dosimeters
23 (TLD).

1 (162) [(455)] "Phantom" means a volume of material behaving in a manner
2 similar to tissue with respect to the attenuation and scattering of radiation.

3 (163) [(456)] "Phototimer" means a method for controlling radiation exposures to
4 image receptors by the amount of radiation which reaches a radiation monitoring
5 device. The radiation monitoring device is part of an electronic circuit which controls the
6 duration of time the tube is activated (see "automatic exposure control").

7 (164) [(457)] "Physician" means an individual licensed to practice medicine or
8 osteopathy in this state.

9 (165) [(458)] "Planned special exposure" means an infrequent exposure to
10 radiation, separate from and in addition to the annual dose limits.

11 (166) [(459)] "Position indicating device" means a device on dental x-ray
12 equipment used to indicate the beam position and to establish a definite source-surface
13 (skin) distance. It may or may not incorporate or serve as a beam-limiting device.

14 (167) [(460)] "Preregistrant" means a person who is preregistered with the
15 cabinet for the intent of obtaining a radiation producing machine registerable under 902
16 KAR 100:110.

17 (168) [(461)] "Preregistration" means preregistration with the cabinet as specified
18 in 902 KAR 100:110.

19 (169) [(462)] "Prescribed dosage" means the quantity of radiopharmaceutical
20 activity as documented:

21 (a) In a written directive;

22 (b) In the diagnostic clinical procedures manual; or

23 (c) In an appropriate record in accordance with the directions of the

1 authorized user for diagnostic procedures.

2 (170) [(463)] "Prescribed dose" means:

3 (a) For gamma stereotactic radiosurgery, the total dose as documented in the
4 written directive;

5 (b) For teletherapy, the total dose and dose per fraction as documented in the
6 written directive; or

7 (c) For brachytherapy, the total source strength and exposure time or the total
8 dose, as documented in the written directive.

9 (171) [(464)] "Primary dose monitoring system" means a system which monitors
10 the useful beam during irradiation and which terminates irradiation if a preselected
11 number of dose monitor units have been acquired.

12 (172) "Principal activities" means activities authorized by the license which are
13 essential to achieving the purpose for which the license was issued or amended.
14 Storage during which no licensed material is accessed for use or disposal and activities
15 incidental to decontamination or decommissioning are not principal activities.

16 (173) [(465)] "Protective apron" means an apron made of radiation absorbing
17 materials of at least 0.25 mm lead equivalency. This requirement may be assumed to
18 have been met if the HVL of the apron is not less than 0.25 mm lead at normal
19 operating voltages.

20 (174) [(466)] "Protective barrier" means a barrier of radiation absorbing material
21 used to reduce radiation exposure.

22 (a) "Primary protective barrier" means a barrier sufficient to attenuate the useful
23 beam to the required degree.

1 (b) "Secondary protective barrier" means a barrier sufficient to attenuate the stray
2 radiation to the required degree.

3 (175) [~~(167)~~] "Protective glove" means a glove made of radiation absorbing
4 materials of at least 0.25 mm lead equivalency. This requirement may be assumed to
5 have been met if the HVL of the glove is not less than 0.25 mm lead at normal operating
6 voltages.

7 (176) [~~(168)~~] "Public dose" means the dose received by a member of the public
8 from sources of radiation from licensed or registered operations]. It shall not include
9 occupational dose or doses received from background radiation, as a patient from
10 medical practices, from voluntary participation in medical research programs, or from
11 exposure to individuals administered radioactive material and released in accordance
12 with 902 KAR 100:073, Section 25.

13 (177) [~~(169)~~] "Qualified expert" means an individual who has demonstrated to the
14 satisfaction of the cabinet that he possesses the knowledge and training to measure
15 ionizing radiation, to evaluate safety techniques, and to advise regarding radiation
16 protection needs.

17 (178) [~~(170)~~] "Quality factor (Q)" means the modifying factor that is used to derive
18 dose equivalent from absorbed dose.

19 (a) Quality factors and absorbed dose equivalencies:

20 Type of Radiation	Quality Factor	Absorbed Dose
21	(Q)	Equal to a Unit Dose Equivalent ^a
22 X-, gamma, or beta radiation	1	1
23 Alpha particles, multiple-		

1	charged particles, fission		
2	fragments, and heavy particles		
3	of unknown charge	20	0.05
4	Neutrons of unknown energy	10	0.1
5	High-energy protons	10	0.1

6 ^aAbsorbed dose in rad equal to one (1) rem or the absorbed dose in gray equal
7 to one (1) sievert.

8 (b) If it is more convenient to measure the neutron fluence rate than to determine
9 the neutron dose equivalent rate in rems per hour or sieverts per hour, as provided in
10 paragraph (a) of this subsection, one (1) rem (0.01 sievert) of neutron radiation of
11 unknown energies may, for purposes of the regulations in this part, be assumed to
12 result from a total fluence of twenty-five (25) million neutrons per square centimeter
13 incident upon the body. If sufficient information exists to estimate the approximate
14 energy distribution of the neutrons, the licensee may use the fluence rate per unit dose
15 equivalent or the appropriate Q value from paragraph (c) of this subsection to convert a
16 measured tissue dose in rads to dose equivalent in rems.

17 (c) Mean quality factors, Q, and fluency per unit dose equivalent for
18 monoenergetic neutrons:

19	Neutron	Quality	Fluency per Unit
20	Energy	Factor ^a	Dose Equivalent ^b
21	(MeV)	(Q)	(neutrons cm ⁻² rem ⁻¹)
22	(thermal) 2.5 x 10 ⁻⁸	2	980 x 10 ⁶
23	1 x 10 ⁻⁷	2	980 x 10 ⁶

1	1×10^{-6}	2	810×10^6
2	1×10^{-5}	2	810×10^6
3	1×10^{-4}	2	840×10^6
4	1×10^{-3}	2	980×10^6
5	1×10^{-2}	2.5	1010×10^6
6	1×10^{-1}	7.5	170×10^6
7	5×10^{-1}	11	39×10^6
8	1	11	27×10^6
9	2.5	9	29×10^6
10	5	8	23×10^6
11	7	7	24×10^6
12	10	6.5	24×10^6
13	14	7.5	17×10^6
14	20	8	16×10^6
15	40	7	14×10^6
16	60	5.5	16×10^6
17	1×10^2	4	20×10^6
18	2×10^2	3.5	19×10^6
19	3×10^2	3.5	16×10^6
20	4×10^2	3.5	14×10^6

21 ^aValue of quality factor (Q) at the point at which the dose equivalent is maximum
 22 in a thirty (30)-cm diameter cylinder tissue-equivalent phantom.

23 ^bMonoenergetic neutrons incident normally on a thirty (30)-cm diameter cylinder tissue-

1 equivalent phantom.

2 (179) [~~(174)~~] "Quarter" means a period of time equal to one-fourth (0.25) of the
3 year observed by the licensee (approximately thirteen (13) consecutive weeks),
4 providing that the beginning of the first quarter in a year coincides with the starting date
5 of the year and that no day is omitted or duplicated in consecutive quarters.

6 (180) [~~(172)~~] "Rad" means the special unit of absorbed dose. One (1) rad equals
7 an absorbed dose of 0.01 joule per kilogram (0.01 gray) or 100 ergs per gram.

8 (181) [~~(173)~~] "Radiation" means ionizing radiation which includes the following:
9 gamma rays, x-rays, alpha particles, beta particles, high speed electrons, neutrons,
10 high-speed protons, and other atomic particles capable of producing ions. This definition
11 shall not include nonionizing radiations, such as sound, microwaves, radiowaves, or
12 visible, infrared, or ultraviolet light.

13 (a) "Leakage radiation" means radiation coming from within the tube or source
14 housing except the useful beam.

15 (b) "Scattered radiation" means radiation that, during passage through matter,
16 has been deviated in direction. It may also have been modified by a decrease in energy.

17 (c) "Useful radiation" means radiation which passes through the window,
18 aperture, cone, or other beam limiting device of the tube or source housing. Sometimes
19 called "primary beam."

20 (d) "Stray radiation" means the sum of leakage and scattered radiation.

21 (182) [~~(174)~~] "Radiation area" means an area, accessible to individuals, in which
22 there exists radiation at levels that an individual may receive in excess of five (5)
23 millirems (0.05 mSv) in one (1) hour at thirty (30) centimeters from the radiation source

1 or from a surface that the radiation penetrates.

2 (183) [(475)] "Radiation machine" means a device capable of producing radiation
3 except devices which produce radiation only from radioactive material.

4 (184) [(476)] "Radiation safety officer" means one who has the knowledge and
5 responsibility to apply appropriate radiation protection administrative regulations.

6 (185) [(477)] "Radiation therapy simulation system" means a fluoroscopic or
7 radiographic x-ray system intended for localizing the volume to be exposed during
8 radiation therapy and confirming the position and size of the therapeutic irradiation field.

9 (186) [(478)] "Radioactive marker" means radioactive material placed subsurface
10 or on a structure intended for subsurface use for the purpose of depth determination or
11 direction orientation.

12 (187) [(479)] "Radioactive material" means a solid, liquid, or gas, which emits
13 radiation spontaneously.

14 (188) [(480)] "Radioactivity" means the disintegration of unstable atomic nuclei by
15 the emission of radiation.

16 (189) [(484)] "Radiograph" means an image receptor on which the image is
17 created directly or indirectly by an x-ray pattern and results in a permanent record.

18 (190) [(482)] "Radiographer" means an individual who performs or who, in
19 attendance at the site where sources of radiation are being used, personally supervises
20 industrial radiographic operations and who is responsible to the licensee or registrant for
21 assuring compliance with the requirements of these administrative regulations and
22 license conditions.

23 (191) [(483)] "Radiographer's assistant" means an individual who, under the

1 personal supervision of a radiographer, uses sources of radiation, related handling
2 tools, or survey instruments in industrial radiography.

3 (192) [~~(184)~~] "Radiographer instructor" means a radiographer who has been
4 authorized by the cabinet to provide on-the-job training to radiographer trainees under
5 902 KAR 100:100, Section 11(1).

6 (193) [~~(185)~~] "Radiographer trainee" means an individual who, under the
7 personal supervision of a radiographer instructor, uses sources of radiation, related
8 handling tools, or radiation survey instruments during the course of instruction.

9 (194) [~~(186)~~] "Radiographic exposure device" means an instrument containing a
10 sealed source fastened or contained therein, in which the sealed source or shielding
11 thereof may be moved, or otherwise changed, from a shielded to unshielded position for
12 purposes of making a radiographic exposure.

13 (195) [~~(187)~~] "Radiographic imaging system" means a system whereby a
14 permanent or semipermanent image is recorded on an image receptor by the action of
15 ionizing radiation.

16 (196) [~~(188)~~] "Radiographic personnel" means a radiographer, radiographer
17 instructor, or radiographer trainee.

18 (197) [~~(189)~~] "Rating" means the operating limits as specified by the component
19 manufacturer.

20 (198) [~~(190)~~] "Recordable event" means the administration of:

21 (a) A radiopharmaceutical or radiation without a written directive if a written
22 directive is required;

23 (b) A radiopharmaceutical or radiation if a written directive is required without

1 daily recording of each administered radiopharmaceutical dosage or radiation dose in
2 the appropriate record;

3 (c) A radiopharmaceutical dosage greater than thirty (30) microcuries of
4 sodium iodide I-125 or I-131 if:

5 1. The administered dosage differs from the prescribed dosage by more than ten
6 (10) percent of the prescribed dosage, and

7 2. The difference between the administered dosage and prescribed dosage
8 exceeds fifteen (15) microcuries;

9 (d) A therapeutic radiopharmaceutical dosage, other than sodium iodide I-125 or
10 I-131, if the administered dosage differs from the prescribed dosage by more than ten
11 (10) percent of the prescribed dosage;

12 (e) A teletherapy radiation dose if the calculated weekly administered dose is
13 fifteen (15) percent greater than the weekly prescribed dose; or

14 (f) A brachytherapy radiation dose if the calculated administered dose differs
15 from the prescribed dose by more than ten (10) percent of the prescribed dose.

16 (199) [~~(194)~~] "Recording" means producing a permanent form of an image
17 resulting from x-ray photons.

18 (200) [~~(192)~~] "Reference man" means a hypothetical aggregation of human
19 physical and physiological characteristics arrived at by international consensus. These
20 characteristics may be used by researchers and public health workers to standardize
21 results of experiments and to relate biological insult to a common base.

22 (201) [~~(193)~~] "Registrant" means a person who is registered with the cabinet and
23 is legally obligated to register with the cabinet under 902 KAR 100:110.

1 (202) [(194)] "Registration" means registration with the cabinet under 902 KAR
2 100:110.

3 (203) [(195)] "Regulations of the U.S. Department of Transportation" means the
4 regulations in 49 CFR Parts 100-189.

5 (204) [(196)] "Rem" means a special unit of quantities expressed as dose
6 equivalent. The dose equivalent in rems is equal to the absorbed dose in rads multiplied
7 by the quality factor (one (1) rem = 0.01 sievert).

8 (205) [(197)] "Research and development" means:

9 (a) Theoretical analysis, exploration, or experimentation; or

10 (b) The extension of investigative findings and theories of a scientific or technical
11 nature into practical application for experimental and demonstration purposes, including
12 the experimental production and testing of models, devices, equipment, materials, and
13 processes. Research and development does not include the internal or external
14 administration of radiation or radioactive material to human beings.

15 (206) [(198)] "Residential location" means an area where structures in which
16 people lodge or live are located, and the grounds on which structures are located, such
17 as houses, apartments, condominiums, and garages.

18 (207) "Residual radioactivity" means radioactivity in structures, materials, soils,
19 groundwater, and other media at a site resulting from activities under the licensee's
20 control. This includes radioactivity from all licensed and unlicensed sources used by the
21 licensee, but excludes background radiation. It also includes radioactive material
22 remaining at the site as a result of routine or accidental releases of radioactive material
23 at the site and previous burials at the site, even if those burials were made in

1. accordance with the provisions of 902 KAR 100:019.

2 (208) [(499)] "Respiratory protective device" means an apparatus used to reduce
3 the individual's intake of airborne radioactive materials, such as a respirator.

4 (209) [(200)] "Restricted area" means an area access to which is limited by the
5 licensee or registrant for purposes of protection of individuals against undue risks from
6 exposure to radiation and radioactive materials. A restricted area shall not include areas
7 used as residential quarters, although a separate room or rooms in a residential building
8 may be set apart as a restricted area.

9 (210) [(204)] "Roentgen" means the special unit of exposure. One (1) roentgen
10 (R) equals 2.58×10^{-4} coulombs per kilogram of air (see "Exposure").

11 (211) [(202)] "Sanitary sewerage" means a system of public sewers for carrying
12 off waste, water, and refuse, but excludes sewage treatment facilities, septic tanks, and
13 leach fields owned or operated by the licensee.

14 (212) [(203)] "Sealed source" means radioactive material that is permanently
15 bonded or fixed in a capsule or matrix designed to prevent leakage or escape of the
16 radioactive material.

17 (213) [(204)] "Secondary dose monitoring system" means a system which
18 terminates irradiation upon failure of the primary system.

19 (214) [(205)] "Secretary" means the Secretary of the Cabinet for Human
20 Resources.

21 (215) [(206)] "Shallow-dose equivalent (H_s)", means the external exposure of the
22 skin or an extremity, means the dose equivalent at a tissue depth of 0.007 centimeter
23 (seven (7) mg/cm^2) averaged over an area of one (1) square centimeter.

1 (216) [(207)] "Shielded position" means the location within the radiographic
2 exposure device or storage container which, by manufacturer's design, is the proper
3 location for storage of the sealed source.

4 (217) [(208)] "Shielded-room radiography" means industrial radiography
5 conducted in a room shielded so that radiation levels at every location on the exterior
6 meet the limitations specified in 902 KAR 100:019, Section 10.

7 (218) [(209)] "Shutter" means a device attached to the tube housing assembly
8 which can totally intercept the useful beam and which has a lead equivalency not less
9 than that of the tube housing assembly.

10 (219) [(210)] "Sievert" means:

11 (a) The International System (SI) unit of quantities expressed as dose equivalent.
12 The dose equivalent in sieverts is equal to the absorbed dose in grays multiplied by the
13 quality factor (1 Sv=100 rems).

14 (b) As used in this administrative regulation, the quality factors for converting
15 absorbed dose to dose equivalent are shown in the table listed in subsection 164 of this
16 section.

17 (220) "Site area emergency" means events may occur, are in progress, or have
18 occurred that could lead to a significant release of radioactive material and that could
19 require a response by offsite response organizations to protect persons offsite.

20 (221) [(211)] "Site boundary" means that line beyond which the land or property
21 is not owned, leased, or otherwise controlled by the licensee.

22 (222) [(212)] "Source" means the focal spot of the x-ray tube.

23 (223) [(213)] "Source changer" means a device designed and used for

1 replacement of sealed sources in radiographic exposure devices, including those
2 source changers also used for transporting and storage of sealed sources.

3 (224) [~~(214)~~] "Source holder" means a housing or assembly into which a
4 radioactive source is placed for the purpose of facilitating the handling and use of the
5 source.

6 (225) [~~(215)~~] "Source image receptor distance (SID)" means the distance from
7 the source to the center of the input surface of the image receptor.

8 (226) [~~(216)~~] "Source material" means:

9 (a) Uranium or thorium, or a combination thereof, in a physical or chemical form;

10 or

11 (b) Ores which contain by weight one-twentieth (1/20) of one (1) percent (0.05
12 percent) or more of:

13 1. Uranium;

14 2. Thorium; or

15 3. Combination thereof.

16 (c) Source material does not include special nuclear material.

17 (227) [~~(217)~~] "Source of radiation" means a radioactive material or device or
18 equipment emitting or capable of producing radiation.

19 (228) [~~(218)~~] "Special form" means radioactive material which satisfies the
20 following conditions:

21 (a) It is a single solid piece or is contained in a sealed capsule that can be
22 opened only by destroying the capsule;

23 (b) The piece or capsule has at least one (1) dimension not less than five (5)

1 millimeters (0.197 inch); and

2 (c) It satisfies the test requirements specified by the U.S. Nuclear Regulatory
3 Commission (NRC). A special form encapsulation designed under the NRC
4 requirements in effect on June 30, 1983, and constructed prior to July 1, 1985, may
5 continue to be used. A special form encapsulation designed or constructed after June
6 30, 1985 shall meet requirements of this definition applicable if it is designed or
7 constructed.

8 (229) [~~(219)~~] "Special nuclear material" means:

9 (a) Plutonium, uranium 233, uranium enriched in the isotope U-233 or in the
10 isotope U-235, and other material which the Governor declares by order to be special
11 nuclear material after the United States Nuclear Regulatory Commission, or successor
12 thereto, has determined the material to be special nuclear material, but does not include
13 source material; or

14 (b) Material artificially enriched by one (1) of the foregoing, but does not include
15 source material.

16 (230) [~~(220)~~] "Special nuclear material in quantities not sufficient to form a critical
17 mass" means uranium enriched in the isotope U-235 in quantities not exceeding 350
18 grams of contained U-235; U-233 in quantities not exceeding 200 grams; plutonium in
19 quantities not exceeding 200 grams; or a combination of them as specified by the
20 following formula: for each kind of special nuclear material, determine the ratio between
21 the quantity of that special nuclear material and the quantity specified above for the
22 same kind of special nuclear material. The sum of these ratios for the different kinds of
23 special nuclear material in combination shall not exceed one (1). For example, the

1 following quantities in combination would not exceed the limitation and are within the
2 formula:

$$3 \quad 175 \text{ (grams contained U-235)}/350$$

$$4 \quad 50 \text{ (grams U-232)}/200 + 50 \text{ (grams Pu)}/200 = 1$$

5 (231) [(224)] "Special purpose x-ray system" means a radiographic x-ray system
6 which, by design, is limited to radiographic examination of a specific anatomical region.

7 (232) [(222)] "Specific activity" means the radioactivity of the radionuclide per unit
8 mass of that nuclide. The specific activity of a material in which the radionuclide is
9 essentially uniformly distributed is the radioactivity per unit mass of the material.

10 (233) [(223)] "Spot check" means a procedure which is performed to assure that
11 a previous calibration continues to be valid.

12 (234) [(224)] "Spot film" means a radiograph which is made during a fluoroscopic
13 examination to permanently record conditions which exist during that fluoroscopic
14 procedure.

15 (235) [(225)] "Spot-film device" means a device intended to transport or position
16 a radiographic image receptor between the x-ray source and fluoroscopic image
17 receptor. It includes a device intended to hold a cassette over the input end of an image
18 intensifier for the purpose of making a radiograph.

19 (236) [(226)] "SSD" means the distance between the source and the skin of the
20 patient.

21 (237) [(227)] "Stochastic effects" means health effects that occur randomly and
22 for which the probability of the effect occurring, rather than its severity, is assumed to be
23 a linear function of dose with threshold, such as hereditary effects and cancer

1 incidence.

2 (238) [~~(228)~~] "Storage" (waste storage) means the holding of waste for treatment
3 or disposal for a period of twenty-four (24) hours or more.

4 (239) [~~(229)~~] "Storage area" means a location, facility, or vehicle which is used to
5 store, transport, or secure a radiographic exposure device, a storage container, or a
6 sealed source if it is not in use and which is locked or has a physical barrier to prevent
7 accidental exposure, tampering with, or unauthorized removal of the device, container,
8 or source.

9 (240) [~~(230)~~] "Storage container" means a device in which sealed sources are
10 transported or stored.

11 (241) [~~(231)~~] "Stray radiation" means the sum of leakage and scattered radiation.

12 (242) [~~(232)~~] "Subsurface tracer study" means the release of a substance tagged
13 with radioactive material for the purpose of tracing the movement or position of the
14 tagged substance in the well-bore or adjacent formation.

15 (243) "Surface contaminated object (SCO)" means a solid object that is not itself
16 classed as radioactive material, but which has radioactive material distributed on any of
17 its surfaces. SCO must be in one (1) of two (2) groups with surface activity not
18 exceeding the following limits:

19 (a) SCO-I: A solid object on which:

20 1. The non-fixed contamination on the accessible surface averaged over 300 cm²
21 (or the area of the surface if less than 300 cm²) does not exceed 10⁻⁴ microcurie/cm² (4
22 Bq/cm²) for beta and gamma and low toxicity alpha emitters, or 10⁻⁵ microcurie/cm² (0.4
23 Bq/cm²) for all other alpha emitters;

1 2. The fixed contamination on the accessible surface averaged over 300 cm² (or
2 the area of the surface if less than 300 cm²) does not exceed 1.0 microcurie/cm² (4x10⁴
3 Bq/cm²) for beta and gamma and low toxicity alpha emitters, or 0.1 microcurie/cm²
4 (4x10³ Bq/cm²) for all other alpha emitters; and

5 3. The non-fixed contamination plus the fixed contamination on the inaccessible
6 surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does
7 not exceed 1 microcurie/cm² (4x10⁴ Bq/cm²) for beta and gamma and low toxicity alpha
8 emitters, for 0.1 microcurie/cm² (4x10³ Bq/cm²) for all other alpha emitters.

9 (b) SCO-II: A solid object on which the limits for SCO-I are exceeded and on
10 which:

11 1. The non-fixed contamination on the accessible surface averaged over 300cm²
12 (or the area of the surface if less than 300 cm²) does not exceed 10⁻² microcurie/cm²
13 (400 Bq/cm²) for beta and gamma and low toxicity alpha emitters or 10⁻³ microcurie/cm²
14 (40 Bq/cm²) for all other alpha emitters;

15 2. The fixed contamination on the accessible surface averaged over 300 cm² (or
16 the area of the surface if less than 300 cm²) does not exceed 20 microcuries/cm² (8x10⁵
17 Bq/cm²) for beta and gamma and low toxicity alpha emitters, or 2 microcuries/cm²
18 (8x10⁴ Bq/cm²) for all other alpha emitters; and

19 3. The non-fixed contamination plus the fixed contamination on the inaccessible
20 surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does
21 not exceed 20 microcuries/cm² (8x10⁵ Bq/cm²) for beta and gamma and low toxicity
22 alpha emitters, or 2 microcuries/cm² (8x10⁴ Bq/cm²) for all other alpha emitters.

23 (244) [(233)] "Survey" means an evaluation of the radiological conditions and

1 potential hazards incident to the production, use, transfer, release, disposal, or
2 presence of sources of radiation. If appropriate, the evaluation shall include a minimum
3 of a physical survey of the location of sources of radiation and measurements or
4 calculations of levels of radiation or concentrations or quantities of radioactive material
5 present.

6 (245) [~~(234)~~] "Technique factors" means the conditions of operation. They are
7 specified as follows:

8 (a) For capacitor energy storage equipment, peak tube potential in kV and
9 quantity of charge in mAs.

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

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

16 (d) For CT x-ray systems not designed for pulsed operation, peak tube potential
17 in kV, and either tube current in mA and scan time in seconds, or the product of tube
18 current and exposure time in mAs and the scan time if the scan time and exposure time
19 are equivalent; and

20 (e) For other equipment, peak tube potential in kV and tube current in mA and
21 exposure time in seconds or the product of tube current and exposure time in mAs.

22 (246) [~~(235)~~] "Teletherapy" means therapeutic irradiation in which the source of
23 radiation is at a distance from the body.

1 (247) [~~(236)~~] "Teletherapy physicist" means the individual identified as the
2 teletherapy physicist on a cabinet license.

3 (248) [~~(237)~~] "Temporary job site" means a location to which radioactive material
4 has been dispatched to perform a job, operation, or study other than the location listed
5 in a specific license or certificate of registration.

6 (249) [~~(238)~~] "Termination of irradiation" means the stopping of irradiation in a
7 fashion which does not permit continuance of irradiation without the resetting of
8 operating conditions at the control panel.

9 (250) [~~(239)~~] "Tests" means the process of verifying compliance with an
10 applicable regulation.

11 (251) [~~(240)~~] "Therapeutic-type protective tube housing" means:

12 (a) For x-ray therapy equipment not capable of operating at 500 kVp or above,
13 the following definition applies: an x-ray tube housing so constructed that the leakage
14 radiation at a distance of one (1) meter from the target does not exceed one (1)
15 roentgen in one (1) hour if the tube is operated at its maximum rated tube potential;

16 (b) For x-ray therapy equipment capable of operating at 500 kVp or above, the
17 following definition applies: an x-ray tube housing so constructed that the leakage
18 radiation at a distance of one (1) meter from the target does not exceed one-tenth (0.1)
19 percent of the useful beam exposure rate at one (1) meter from the target, for its
20 operating conditions;

21 (c) Small areas of reduced protection are acceptable providing the
22 average reading over a 100 square centimeter area at one (1) meter distance from the
23 target does not exceed the values given above.

1 (252) [(241)] "Tomogram" means the depiction of the x-ray attenuation properties
2 of a section through the body.

3 (253) [(242)] "Total effective dose equivalent (TEDE)" means the sum of the
4 deep-dose equivalent (for external exposures) and the committed effective dose
5 equivalent (for internal exposures).

6 (254) [(243)] "Traceable to a national standard" means that a quantity or a
7 measurement has been compared to a national standard directly or indirectly through
8 one (1) or more intermediate steps and that comparisons have been documented.

9 (255) [(244)] "Transport container" means a package that is designed to provide
10 radiation safety and security if sealed sources are transported and which meets the
11 requirements of the 49 CFR 173, Subpart I.

12 (256) [(245)] "Transport index" means the dimensionless number (rounded up to
13 the first decimal place) placed on the label of a package to designate the degree of
14 control to be exercised by the carrier during transportation. The transport index is
15 determined as follows:

16 (a) For non-fissile material packages, the number determined by multiplying
17 the maximum radiation level in millisievert (mSv) per hour at one (1) meter (3.3 feet)
18 from the external surface by 100 (equivalent to the maximum radiation level in millirem
19 per hour at one (1) meter (3.3 feet); or

20 (b) For fissile material packages, the number determined by multiplying the
21 maximum radiation level in millisievert per hour at one (1) meter (3.3 feet) from the
22 external surface of the package by 100 (equivalent to the maximum radiation level in
23 millirem per hour at one (1) meter (3.3 feet), or, for criticality control purposes, the

1 number obtained as described in 10 C.F.R. Part 71.59, whichever is larger [the number
2 ~~expressing the maximum radiation level in millirem per hour at one (1) meter from the~~
3 ~~external surface of the package~~].

4 (257) [(246)] "Treatment" (waste treatment) means a method, technique, or
5 process, including storage for radioactive decay, designed to change the physical,
6 chemical, or biological characteristics or composition of a waste in order to render the
7 waste for transport, storage or disposal, amendable to recovery, convertible to another
8 usable material, or reduced in volume.

9 (258) [(247)] "Tube" means an x-ray tube, unless otherwise specified.

10 (259) [(248)] "Tube housing assembly" means the tube housing with tube
11 installed. It includes high-voltage or filament transformers and other appropriate
12 elements if they are contained within the tube housing.

13 (260) [(249)] "Tube rating chart" means the set of curves which specify the rated
14 limits of operation of the tube in terms of the technique factors.

15 (261) [(250)] "Type A quantity" means a quantity of radioactive material, the
16 aggregate radioactivity of which does not exceed A_1 for special form radioactive
17 material or A_2 for normal form radioactive material, where A_1 and A_2 are given in 902
18 KAR 100:070, Section 21, or may be determined by procedures described in 902 KAR
19 100:070, Section 20.

20 (262) [(251)] "Type B package" means a Type B packaging together with its
21 radioactive contents. On approval a [A] Type B package design is designated by NRC
22 as B(U) unless the package has a maximum normal operating pressure of more than
23 700 kPa (100 lb/in²) gauge or a pressure relief device that would allow the release of

1 radioactive material to the environment under the tests specified in 10 C.F.R. Part 71.73
2 (hypothetical accident conditions), in which case it will receive a designation B(M) [or
3 B(M)]. B(U) refers to the need for unilateral approval of international shipments; B(M)
4 refers to the need for multilateral approval. There is no distinction made in how
5 packages with these designations may be used in domestic transportation. To
6 determine their distinction for international transportation, refer to U.S. Department of
7 Transportation regulations in 49 CFR Part 173. A Type B package approved prior to
8 September 6, 1983, was designated only as Type B. Limitations on its use are specified
9 in 902 KAR 100:070, Section 6 [7].

10 (263) [(252)] "Type B packaging" means a packaging designed to retain the
11 integrity of containment and shielding required by U.S. Nuclear Regulatory Commission
12 regulations if subjected to the normal conditions of transport and hypothetical accident
13 test conditions set forth in 10 CFR Part 71.

14 (264) [(253)] "Type B quantity" means a quantity of radioactive material greater
15 than a Type A quantity.

16 (265) [(254)] "U.S. Department of Energy" means the Department of Energy
17 established by 42 USC 7101 et seq., to the extent that the department exercises
18 functions formerly vested in the U.S. Atomic Energy Commission, its chairman,
19 members, officers and components and transferred to the U.S. Energy Research and
20 Development Administration and to the Administrator thereof and retransferred to the
21 Secretary of Energy in 42 USC 7151, effective October 1, 1977.

22 (266) [(255)] "Unrefined and unprocessed ore" means ore in its natural form prior
23 to processing, such as grinding, roasting, beneficiating, or refining.

1 (267) [(256)] "Unrestricted area" means an area access to which is not controlled
2 or limited by the licensee or registrant for purposes of protection of individuals from
3 exposure to radiation and radioactive material.

4 (268) "Uranium – natural, depleted, enriched" means:

5 (a) "natural uranium" means uranium with the naturally occurring distribution of
6 uranium isotopes (approximately 0.711 weight percent uranium-235, and the remainder
7 by weight essentially uranium-238);

8 (b) "depleted uranium" means uranium containing less uranium-235 than the
9 naturally occurring distribution of uranium isotopes;

10 (c) "enriched uranium" means uranium containing more uranium-235 than the
11 naturally occurring distribution of uranium isotopes.

12 (269) [(257)] "Uranium fuel cycle" means the operations of milling of uranium ore,
13 chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium
14 fuel, generation of electricity by a light-water-cooled nuclear power plant using uranium
15 fuel, and reprocessing of spent uranium fuel to the extent that these activities directly
16 support the production of electrical power for public use. Uranium fuel cycle shall not
17 include mining operations, operations at waste disposal sites, transportation of
18 radioactive material in support of these operations, and the reuse of recovered
19 nonuranium special nuclear and byproduct materials from the cycle.

20 270) [(258)] "Useful beam" means the radiation which passes through the tube
21 housing port and the aperture of the beam limiting device if the exposure switch or timer
22 (is activated.

23 (271) [(259)] "User" means an individual who personally utilizes or manipulates a

1 source of radiation.

2 (272) [~~(260)~~] "Variable-aperture beam limiting device" means a beam limiting
3 device which has capacity for stepless adjustment of the x-ray field size at a given SID.

4 (273) [~~(264)~~] "Vendor" means for the purposes of 902 KAR 100:110 a person
5 who sells for profit radiation producing machines or accelerators registerable with the
6 cabinet as specified by 902 KAR 100:110.

7 (274) [~~(262)~~] "Vendor registrant" means a vendor who is registered with the
8 cabinet.

9 (275) [~~(263)~~] "Vendor registration" means registration of a vendor with the cabinet
10 described by 902 KAR 100:110.

11 (276) [~~(264)~~] "Very high radiation area" means an area, accessible to individuals,
12 in which radiation levels may result in an individual receiving an absorbed dose in
13 excess of 500 rads (five (5) grays) in one (1) hour at one (1) meter from a radiation
14 source or from a surface that the radiation penetrates. At very high doses received at
15 high dose rates, units of absorbed dose (such as rads and grays) are appropriate,
16 rather than units of dose equivalent (such as rems and sieverts).

17 (277) [~~(265)~~] "Visible area" means that portion of the input surface of the image
18 receptor over which incident x-ray photons are producing a visible image.

19 (278) [~~(266)~~] "Visiting authorized nuclear pharmacist" means a nuclear
20 pharmacist who is not identified on the license of the licensee being visited.

21 (279) [~~(267)~~] "Visiting authorized user" means an authorized user who is not
22 identified on the license of the licensee being visited.

23 (280) [~~(268)~~] "Waste" (see "low-level radioactive waste").

1 (281) [(269)] "Wedge filter" means an added filter effecting continuous
2 progressive attenuation on the useful beam or a part thereof.

3 (282) [(270)] "Week" means seven (7) consecutive days starting on Sunday.

4 (283) [(274)] "Weighting factor (W_T)", for an organ or tissue (T) means the
5 proportion of the risk of stochastic effects resulting from irradiation of that organ or
6 tissue to the total risk of stochastic effects if the whole body is irradiated uniformly. For
7 calculating the effective dose equivalent, the values of (W_T) are:

8 Organ Dose Weighting Factors

9	Organ or tissue	W_T
10	Gonads	0.25
11	Breast	0.15
12	Red bone marrow	0.12
13	Lung	0.12
14	Thyroid	0.03
15	Bone surfaces	0.03
16	Remainder	¹ 0.30
17	Whole Body	² 1.00

18 ¹0.30 results from 0.06 for each of five (5) "remainder" organs (excluding the skin and
19 the lens of the eye) that receive the highest doses.

20 ²For the purpose of weighting the external whole body dose (for adding it to the internal
21 dose), a single weighting factor, $W_T=1.0$, has been specified. The use of other weighting
22 factors for external exposure will be approved on a case-by-case basis until a time as
23 specific guidance is issued.

1 (284) [~~(272)~~] "Well-bore" means a drilled hole in which wire line service
2 operations and subsurface tracer studies are performed.

3 (285) [~~(273)~~] "Well-logging" means the lowering and raising of measuring devices
4 or tools which may contain sources of radiation in well-bores or cavities for the purpose
5 of obtaining information about the well or adjacent formations.

6 (286) [~~(274)~~] "Whole body" means, for purposes of external exposure, head,
7 trunk (including male gonads), arms above the elbow, or legs above the knee.

8 (287) [~~(275)~~] "Wire line" means a cable containing one (1) or more electrical
9 conductors which is used to lower and raise logging tools in the well-bore.

10 (288) [~~(276)~~] "Wire line service operation" means an evaluation or mechanical
11 service which is performed in the well-bore using devices on a wire line.

12 (289) [~~(277)~~] "Worker" means an individual engaged in activities licensed or
13 registered by the cabinet and controlled by a licensee or registrant, but does not include
14 the licensee or registrant.

15 (290) [~~(278)~~] "Working level (WL)" means a combination of short-lived radon
16 daughters (for radon-222: polonium-218, lead-214, bismuth-214, and polonium-214; and
17 for radon-220: polonium-216, lead-212, bismuth-212, and polonium-212) in one (1) liter
18 of air that results in the ultimate emission of 1.3×10^5 MeV of potential alpha particle
19 energy.

20 (291) [~~(279)~~] "Working level month (WLM)" means an exposure to one (1)
21 working level for 170 hours (2,000 working hours per year/twelve (12) months per year
22 = approximately 170 hours per month).

23 (292) [~~(280)~~] "Written directive" means an order in writing for a specific patient or

1 human research subject, dated and signed by an authorized user prior to the
2 administration of a radiopharmaceutical or radiation, except as specified in paragraph (f)
3 of this subsection, and containing the following information:

4 (a) For an administration of quantities greater than thirty (30) microcuries of
5 sodium iodide I-125 or I-131: the dosage;

6 (b) For a therapeutic administration of a radiopharmaceutical other than sodium
7 iodide I-125 or I-131: the radiopharmaceutical, dosage, and route of administration;

8 (c) For gamma stereotactic radiosurgery: target coordinates, collimator size, plug
9 pattern, and total dose;

10 (d) For teletherapy: the total dose, dose per fraction, treatment site, and overall
11 treatment period;

12 (e) For high-dose-rate remote afterloading brachytherapy: the radioisotope,
13 treatment site, and total dose; or

14 (f) For all other brachytherapy:

15 1. Prior to implementation: the radioisotope, number of sources, and source
16 strengths; and

17 2. After implantation, but prior to completion of the procedure: the radioisotope,
18 treatment site, and total source strength and exposure time (or, equivalently, the total
19 dose).

20 (293) [~~(284)~~] "X-ray control" means a device which controls input power to the x-
21 ray high-voltage generator or the x-ray tube. It includes timers, phototimers, automatic
22 brightness stabilizers, and similar devices which control the technique factors of an x-
23 ray exposure.

1 (294) [~~(282)~~] "X-ray equipment" means an x-ray system, subsystem, or
2 component thereof. X-ray equipment may be used as:

3 (a) "Mobile" means x-ray equipment mounted on a permanent base with wheels
4 or casters for moving while completely assembled.

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

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

7 (d) "Transportable" means x-ray equipment installed in a vehicle or trailer.

8 (295) [~~(283)~~] "X-ray field" means that area of the intersection of the useful beam
9 and one (1) of the set of planes parallel to and including the plane of the image
10 receptor, whose perimeter is the locus of points at which the exposure rate is one-fourth
11 (1/4) of the maximum in the intersection.

12 (296) [~~(284)~~] "X-ray high-voltage generator" means a device which transforms
13 electrical energy from the potential supplied by the x-ray control to the tube operating
14 potential. The device may also include means for transforming alternating current to
15 direct current, filament transformers for the x-ray tube, high-voltage switches, electrical
16 protective devices, and other appropriate elements.

17 (297) [~~(285)~~] "X-ray subsystem" means a combination of two (2) or more
18 components of an x-ray system.

19 (298) [~~(286)~~] "X-ray system" means an assemblage of components for the
20 controlled production of x-rays. It includes minimally an x-ray high-voltage generator, an
21 x-ray control, a tube housing assembly, a beam-limiting device, and the necessary
22 supporting structures. Additional components which function with the system are
23 considered integral parts of the system.

1 (299) [~~(287)~~] "X-ray tube" means an electron tube which is designed to be used
2 primarily for the production of x-rays.

3 (300) [~~(288)~~] "Year" means the period of time beginning in January used to
4 determine compliance with the provisions of 902 KAR Chapter 100. The licensee or
5 registrant may change the starting date of the year used to determine compliance by the
6 licensee or registrant provided the change is made at the beginning of the year and that
7 no day is omitted or duplicated in consecutive years.