

Rule 391-3-17-.01 GENERAL PROVISIONS. AMENDED.

- (1) Scope. Except as otherwise specifically provided, this Chapter, 391-3-17, applies to all persons who receive, possess, use, transfer, own, or acquire any source of radiation; provided, however, that nothing in this Chapter shall apply to any person to the extent such person is subject to regulation by the U.S. Nuclear Regulatory Commission.¹ Nothing in Rule 391-3-17-.03 of this Chapter shall be interpreted as limiting the intentional exposure of patients to radiation for the purpose of diagnosis or therapy.
- (2) Definitions. As used in this Chapter, these terms have the definitions set forth below. Additional definitions used only in a certain Rule will be found in that Rule.
 - (a) "A₁" means the maximum activity of special form radioactive material permitted in a Type A package. "A₂" means the maximum activity of radioactive material, other than special form, LSA and SCO material, permitted in a Type A package. These values are either listed in the "Table of A₁ and A₂ Values for Radionuclides" of 49 CFR 173.435 or may be derived in accordance with the procedure prescribed in 49 CFR 173.433-173.435.
 - (b) "Absorbed dose" means the energy imparted by ionizing radiation per unit mass of irradiated material. The units of absorbed dose are the rad and the Gray (Gy).
 - (c) "Accelerator-produced material" means any material made radioactive by a particle accelerator.
 - (d) "Act" means Chapter 13 of the Official Code of Georgia, Annotated, entitled "Radiation Control" as amended.
 - (e) "Activity" means the rate of disintegration or transformation or decay of radioactive material. The units of activity are the Curie (Ci) and the Becquerel (Bq).
 - (f) "Adult" means an individual 18 or more years of age.
 - (g) "Agreement State" means any State with which the U.S. Nuclear Regulatory Commission or the U.S. Atomic Energy Commission has entered into an effective agreement under subsection 274b. of the Atomic Energy Act of 1954, as amended (73 Stat. 689).

¹Attention is directed to the fact that 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 the provisions of the agreement between the State of Georgia and the U.S. Nuclear Regulatory Commission and to 10 CFR Part 150 of the Commission's regulations.

- (h) "Airborne radioactive material" means any radioactive material dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases.
- (i) "Airborne radioactivity area" means A room, enclosure or operating area in which airborne radioactive materials, composed wholly or partly of licensed materials, exist in concentrations;
 - 1. In excess of the derived air concentrations (DACs) specified in Appendix B, to 10 CFR 20.1001-20.2401, or
 - 2. To such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI) or 12 DAC-hours.
- (j) "Annually" means once every 12 calendar months or no later than the last day of the same calendar month of the following year.
- (k) "As low as is reasonably achievable" (ALARA) means making every reasonable effort to maintain exposures to radiation as far below the dose limits in this Chapter as is practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to the 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 utilization of nuclear energy and licensed or registered sources of radiation in the public interest.
- (l) "Background radiation" means radiation from cosmic sources; naturally occurring radioactive materials, including radon, except as a decay product of source or special nuclear material, and including global fallout as it exists in the environment from the testing of nuclear explosive devices or from past nuclear accidents such as Chernobyl that contribute to background radiation and are not under the control of the licensee. "Background radiation" does not include sources of radiation from radioactive materials regulated by the Department.
- (m) "Becquerel" (Bq) means the SI unit of activity. One Becquerel is equal to one disintegration or transformation per second.
- (n) "Bioassay" means the determination of kinds, quantities or concentrations, and, in some cases, the locations of radioactive material in the human body, whether by direct measurement, in vivo counting, or by analysis and evaluation of materials excreted or removed from the human body. For purposes of this Chapter, "radiobioassay" is an equivalent term.

- (o) "Byproduct material" means:
1. Any radioactive material, except special nuclear material, yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material; and
 2. The tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface wastes resulting from uranium or thorium solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute "byproduct material" within this definition.
- (p) "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.
- (q) "CFR" means the Code of Federal Regulations.
- (r) "Collective dose" means the sum of the individual doses received in a given period of time by a specified population from exposure to a specified source of radiation.
- (s) "Committed dose equivalent" ($H_{T,50}$) means the dose equivalent to organs or tissues of reference (T) that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.
- (t) "Committed effective dose equivalent" ($H_{E,50}$) is the sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to each of these organs or tissues ($H_{E,50} = \sum w_T H_{T,50}$).
- (u) "Curie" means a unit of quantity of radioactivity. One Curie (Ci) is that quantity of radioactive material that decays at the rate of 3.7×10^{10} transformations per second (tps).
- (v) "Daily" means once every calendar day worked.
- (w) "Deep dose equivalent" (H_d), which applies to external whole body exposure, means the dose equivalent at a tissue depth of one centimeter ($1,000 \text{ mg/cm}^2$).

- (x) "Department" means the Department of Natural Resources of the State of Georgia.
- (y) "Depleted uranium" means the source material uranium in which the isotope uranium-235 is less than 0.711 weight percent of the total uranium present. Depleted uranium does not include special nuclear material.
- (z) "Derived air concentration" (DAC) means the concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2,000 hours under conditions of light work (inhalation rate 1.2 cubic meters of air per hour), results in an intake of one ALI. (Annual Limit on Intake defined in Rule .03 (2) (d)) DAC values are given in Table 1, Column 3 of Appendix B to 10 CFR 20.1001 - 20.2401.
- (aa) "Dose" is a generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent.
- (bb) "Dose equivalent" (H_T) means the 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 rem and Sievert (Sv).
- (cc) "Dose limits" means the permissible upper bounds of radiation doses established in accordance with this Chapter. For purposes of this Chapter, "limits" is an equivalent term.
- (dd) "Effective dose equivalent" (H_E) means the sum of the products of the dose equivalent to each organ or tissue (H_T) and the weighting factor (w_T) applicable to each of the body organs or tissues that are irradiated ($H_E = \sum w_T H_T$).
- (ee) "Embryo/fetus" means the developing human organism from conception until the time of birth.
- (ff) "Entrance or access point" means any opening through which an individual or extremity of an individual could gain access to radiation areas or to licensed radioactive materials. This includes entry or exit portals of sufficient size to permit human entry, irrespective of their intended use.
- (gg) "Explosive material" means any chemical compound, mixture, or device that produces a substantial instantaneous release of gas and heat spontaneously or by contact with sparks or flame.
- (hh) "Exposure" means being exposed to ionizing radiation or to radioactive material.

- (ii) "Exposure rate" means the exposure per unit of time, such as Roentgen per minute or milliroentgen per hour.
- (jj) "External dose" means that portion of the dose equivalent received from any source of radiation outside the body.
- (kk) "Extremity" means hand, elbow, arm below the elbow, foot, knee, and leg below the knee.
- (ll) "Former U.S. Atomic Energy Commission (AEC) or U.S. Nuclear Regulatory Commission (NRC) licensed facilities" means nuclear reactors, nuclear fuel reprocessing plants, uranium enrichment plants, or critical mass experimental facilities where AEC or NRC licenses have been terminated.
- (mm) "Generally applicable environmental radiation standards" means standards issued by the U.S. Environmental Protection Agency (EPA) under the authority of the Atomic Energy Act of 1954, as amended, that impose limits on radiation exposures, levels, concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material.
- (nn) "Gray" (Gy) means the SI unit of absorbed dose. One Gray is equal to an absorbed dose of one Joule/kilogram (100 rad).
- (oo) "Hazardous waste" means those wastes designated as hazardous by U.S. Environmental Protection Agency regulations in 40 CFR Part 261.
- (pp) "Healing arts" means medicine, dentistry, chiropractic, podiatry, osteopathy or veterinary medicine.
- (qq) "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 0.1 rem (1 mSv) in one hour at 30 centimeters from any source of radiation or from any surface that the radiation penetrates. For purposes of this Chapter, rooms or areas in which diagnostic x-ray systems are used for healing arts purposes are not considered high radiation areas.
- (rr) "Human use" means the internal or external administration of radiation or radioactive material to human beings.
- (ss) "Individual" means any human being.
- (tt) "Individual monitoring" means the assessment of:

1. Dose equivalent by the use of:
 - (i) Individual monitoring devices, or
 - (ii) Survey data; or
 2. Committed effective dose equivalent:
 - (i) By bioassay, or
 - (ii) By determination of the time-weighted air concentrations to which an individual has been exposed, that is, DAC-hours [See the definition of DAC-hours in Rule 391-3-17-.03(2)(q)].
- (uu) "Individual monitoring devices" means devices designed to be worn by a single individual for the assessment of dose equivalent. For purposes of this Chapter, individual monitoring devices and personnel monitoring equipment are equivalent terms. Examples of individual monitoring devices are film badges, thermoluminescent dosimeters (TLDs), optically stimulated luminescent devices, pocket ionization chambers, and personal air sampling devices.
- (vv) "Inspection" means an official examination or observation including, but not limited to, tests, surveys, and monitoring to determine compliance with Rules, Regulations, Orders, requirements, and conditions of the Department.
- (ww) "Interlock" means a device arranged or connected such that the occurrence of an event or condition is required before a second event or condition can occur or continue to occur.
- (xx) "Internal dose" means that portion of the dose equivalent received from radioactive material taken into the body.
- (yy) "Lens dose equivalent" (LDE) means the external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm^2).
- (zz) "License" means a license issued by the Department in accordance with the Regulations promulgated by the Board.
- (aaa) "Licensed material" means radioactive material received, possessed, used, transferred or disposed of under a general or specific license issued by the Department.

- (bbb) "Licensee" means any person who is licensed by the Department in accordance with this Chapter and the Act.
- (ccc) "Licensing State" means any state with regulations equivalent to the Suggested State Regulations for Control of Radiation relating to, and an effective program for, the regulatory control of NARM and which has been granted final designation by the Conference of Radiation Control Program Directors, Inc.
- (ddd) "Limits" [See Dose limits].
- (eee) "Lost or missing licensed material" means licensed material whose location is unknown. This definition includes licensed material that has been shipped but has not reached its planned destination and whose location cannot be readily traced in the transportation system.
- (fff) "Major processor" means a user processing, handling, or manufacturing radioactive material exceeding Type A quantities as unsealed sources or material, or exceeding four times Type B quantities as sealed sources, but does not include nuclear medicine programs, universities, industrial radiographers, or small industrial programs. Type A and B quantities are defined in Section 71.4 of 10 CFR Part 71.
- (ggg) "Management" means the chief executive officer or other individual having the authority to manage, direct, or administer the licensee's activities, or those persons' delegate or delegates.
- (hhh) "Member of the public" means any individual except when that individual is receiving an occupational dose.
- (iii) "Minor" means an individual less than 18 years of age.
- (jjj) "Monthly" means once every calendar month, not to exceed an interval of 35 days.
- (kkk) "Monitoring" means the measurement of radiation, radioactive material concentrations, surface area activities or quantities of radioactive material and the use of the results of these measurements to evaluate potential exposures and doses. For purposes of this Chapter, "radiation monitoring" and "radiation protection monitoring" are equivalent terms.
- (lll) "NARM" means any naturally-occurring or accelerator-produced radioactive material. It does not include byproduct, source, or special nuclear material.
- (mmm) "Natural radioactivity" means radioactivity of naturally-occurring nuclides.

- (nnn) "NORM" (Naturally-Occurring Radioactive Material) means any nuclide which is radioactive in its natural physical state (i.e., not man-made), but does not include byproduct, source, or special nuclear material.
- (ooo) "Nuclear Regulatory Commission" (NRC) means the U.S. Nuclear Regulatory Commission or its duly authorized representatives.
- (ppp) "Occupational dose" means the dose received by an individual in the course of employment while engaged in activities licensed by the Department in which the individual's assigned duties involve exposure to licensed and unlicensed sources of radiation whether in the possession of the licensee, or other person. Occupational dose does not include doses received from background radiation, as a patient from medical practices, from exposure from individuals administered radioactive material and released in accordance with Rule 391-3-17-.05(37), from voluntary participation in medical research programs, or as a member of the public.
- (qqq) "Package" means the assembly of components necessary to ensure compliance with packing requirements of DOT regulations together with its radioactive contents as presented for transport.
1. "Fissile material package" means a fissile material packaging together with its fissile material contents.
 2. "Type B package" means a Type B packaging together with its radioactive contents. On approval, a Type B package design is designated by NRC as B(U) unless the package has a maximum normal operating pressure of more than 700 kPa (100 lb/in²) gauge or pressure relief device that will allow the release of radioactive material to the environment under the tests specified in 10 CFR 71 (hypothetical accident conditions), in which case it will receive a designation B(M). B(U) refers to the need for unilateral approval of international shipments; B(M) refers to the need for multilateral approval of international shipments. There is no distinction made in how packages with these designations may be used in domestic transportation. To determine their distinction for international transportation, see DOT regulations in 49 CFR 173. A Type B package approved before September 6, 1983, was designated only as Type B. Limitations on its use are specified in 10 CFR 71.13.

- (rrr) "Particle accelerator" means any machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium at energies usually in excess of one MeV.
- (sss) "Person" means any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, agency, political subdivision of this State, any other state or political subdivision or agency thereof, and any legal successor, representative, agent, or department of the foregoing, but shall not include federal government agencies.
- (ttt) "Personnel monitoring equipment" [See Individual monitoring devices].
- (uuu) "Pharmacist" means any individual who is licensed to practice Pharmacy in this State by the Georgia State Board of Pharmacy.
- (vvv) "Physician" means any person who is licensed to engage in the practice of medicine under the Authority of O.C.G.A. 43-34-20 or the limited practice of medicine under O.C.G.A. 43-35-1.
- (www) "Principal activities," as used in this Chapter, means activities authorized by the license which are essential to achieving the purpose(s) for which the license was issued or amended. Storage during which no license material is accessed for use or disposal and activities incidental to decontamination or decommissioning are not principal activities.
- (xxx) "Public dose" means the dose received by a member of the public from radiation and/or radioactive material released by a licensee or from any other source of radiation under the control of a licensee. It does not include occupational dose, doses received from background radiation, doses received as a patient from medical practices, from exposure from individuals administered radioactive material and released in accordance with Rule 391-3-17-.05(37), or doses from voluntary participation in medical research programs.
- (yyy) "Pyrophoric liquid" means any liquid that ignites spontaneously in dry or moist air at or below 130 °F (54.4 °C). A pyrophoric solid is any solid material, other than one classed as an explosive, which under normal conditions is liable to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and, when ignited, burns so vigorously and persistently as to create a serious transportation, handling, or disposal hazard. Included are spontaneously combustible and water-reactive materials.

- (zzz) "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 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.
- (aaaa) "Quality factor" (Q) means the modifying factor, listed in Tables 1 and 2 of this Rule that is used to derive dose equivalent from absorbed dose.
- (bbbb) "Quarterly" means once every three calendar months or no later than the last day of the third month after the initial month.
- (cccc) "Rad" means the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs/gram or 0.01 Joule/kilogram (0.01 Gray).
- (dddd) "Radiation" means alpha particles, beta particles, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other particles capable of producing ions. For purposes of this Chapter, ionizing radiation is an equivalent term. Radiation, as used in this Chapter, does not include non-ionizing radiation, such as radiowaves, microwaves, visible, infrared, or ultraviolet light.
- (eeee) "Radiation area" means any area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5 mrem (0.05 mSv) in one hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates.
- (ffff) "Radiation machine" means any device capable of producing radiation except those devices with radioactive material as the only source of radiation.
- (gggg) "Radiation Safety Officer" (RSO) means an individual who has the knowledge and responsibility to apply appropriate radiation protection regulations.
- (hhhh) "Radioactive material" means any solid, liquid, or gas that emits radiation spontaneously.
- (iiii) "Radioactivity" means the transformation of unstable atomic nuclei by the emission of radiation.

- (jjjj) "Regulations of the U.S. Department of Transportation" means the regulations in 49 CFR Parts 100-189.
- (kkkk) "Rem" means the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor (1 rem = 0.01 Sievert).
- (llll) "Research and development" means
1. Theoretical analysis, exploration, or experimentation; or
 2. 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. Research and development does not include the internal or external administration of radiation or radioactive material to human beings.
- (mmmm) "Restricted area" means any area to which access is limited by the licensee for purposes of protecting individuals against undue risks from exposure to sources of radiation and radioactive material. A 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.
- (nnnn) "Roentgen" means the special unit of exposure. One Roentgen (R) equals 2.58×10^{-4} Coulombs/kilogram of air.
- (oooo) "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.
- (pppp) "Shallow dose equivalent" (H_s), which applies to the external exposure of the skin of the whole body or the skin of an extremity, means the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm^2).
- (qqqq) "SI" means an abbreviation of the International System of Units.
- (rrrr) "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 multiplied by the quality factor (1 Sv = 100 rem).
- (ssss) "Site boundary" means that line beyond which the land or property is not owned, leased, or otherwise controlled by the licensee.

(tttt) "Source material" means

1. Uranium or thorium, or any combination thereof, in any physical or chemical form; or
2. Ores that contain by weight one-twentieth of one percent (0.05 percent) or more of uranium, thorium, or any combination thereof. Source material does not include special nuclear material.

(uuuu) "Source material milling" means any activity that results in the production of byproduct material as defined by .01(2)(o)2.

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

(www) "Special form radioactive material" means radioactive material that satisfies the following conditions:

1. It is either a single solid piece or is contained in a sealed capsule that can be opened only by destroying the capsule;
2. The piece or capsule has at least one dimension not less than five millimeters (0.197 inch); and
3. It satisfies the test requirements specified by the U.S. Nuclear Regulatory Commission. A special form encapsulation designed in accordance with the U.S. Nuclear Regulatory Commission requirements in effect on June 30, 1983, and constructed prior to July 1, 1985, may continue to be used. A special form encapsulation either designed or constructed after June 30, 1985, must meet requirements of this definition applicable at the time of its design or construction.

(xxxx) "Special nuclear material" means:

1. Plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, and any other material that the U.S. Nuclear Regulatory Commission, pursuant to the provisions of section 51 of the Atomic Energy Act of 1954, as amended, determines to be special nuclear material but does not include source material; or
2. Any material artificially enriched by any of the foregoing but does not include source material.

(yyyy) "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 such ratios for all of the kinds of special nuclear material in combination shall not exceed 1.

For example, the following quantities in combination would not exceed the limitation and are within the formula:

$$\frac{175 \text{ (grams contained U-235)}}{350} + \frac{50 \text{ (grams U-233)}}{200} + \frac{50 \text{ (grams Pu)}}{200} \leq 1$$

(zzzz) "Survey" means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of sources of radiation. When appropriate, such evaluation includes, but is not limited to, tests, physical examinations, and measurements of levels of radiation or concentrations of radioactive material present.

(aaaaa) "Test" means the process of verifying compliance with an applicable regulation.

(bbbbbb) "This Chapter" means all of the Rules in Chapter 391-3-17.

(ccccc) "Total effective dose equivalent" (TEDE) means the sum of the deep dose equivalent for external exposures and the committed effective dose equivalent for internal exposures.

(dddddd) "U.S. Department of Energy" means the Department of Energy established by Public Law 95-91, August 4, 1977, 91 Stat. 565, 42 U.S.C. 7101 et seq., to the extent that the Department exercises functions formerly vested in the U.S. Atomic Energy Commission, its Chairman, members, officers, and components and transferred to the U.S. Energy Research and Development Administration and to the Administrator thereof pursuant to sections 104(b), (c) and (d) of the Energy Reorganization Act of 1974 (Public Law 93-438, October 11, 1974, 88 Stat. 1233 at 1237, 42 U.S.C. 5814, effective January 19, 1975) and retransferred to the Secretary of Energy pursuant to section 301(a) of the Department of Energy Organization Act (Public Law 95-91, August 4, 1977, 91 Stat. 565 at 577-578, 42 U.S.C. 7151, effective October 1, 1977).

- (eeee) "Unrefined and unprocessed ore" means ore in its natural form prior to any processing, such as grinding, roasting, beneficiating, or refining.
- (ffff) "Unrestricted area" means an area to which access is neither limited nor controlled by the licensee.
- (ggggg) "Very High Radiation Area" means an area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rads (5 Grays) in one hour at one meter from a radiation source or from any surface that the radiation penetrates.
- (hhhhh) "Waste" means those low-level radioactive wastes that are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level waste has the same meaning as in the Low-Level Radioactive Waste policy Act, P.L. 96-573, as amended by P.L. 99-240, effective January 15, 1986; that is, radioactive waste (a) not classified as high-level radioactive waste, spent nuclear fuel, or byproduct material as defined in Section 11e.(2) of the Atomic Energy Act (uranium or thorium tailings and waste), and (b) classified as low-level radioactive waste consistent with existing law and in accordance with (a) above by the U.S. Nuclear Regulatory Commission.
- (iiii) "Waste handling licensees" mean persons licensed to receive and store radioactive wastes prior to disposal and/or persons licensed to dispose of radioactive waste.
- (jjjj) "Weekly" means once every calendar week, not to exceed an interval of ten days.
- (kkkkk) "Whole body" means, for purposes of external exposure, head, trunk, including male gonads, arms above the elbow, or legs above the knee.
- (llll) "Worker" means an individual engaged in work under a license issued by the Department and controlled by a licensee. If the licensee is an individual rather than one of the other legal entities defined under "person," the radiation exposure limits for the worker also apply to the individual who is the licensee.
- (mmmm) "Working level" (WL) means any combination of short-lived radon daughters in one liter of air that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha particle energy. The short-lived radon daughters for radon-222 are: polonium-218, lead-214, bismuth-214, and polonium-214; and for radon-220: polonium-216, lead-212, bismuth-212, and polonium-212.

(nnnnn) "Working level month" (WLM) means an exposure to one working level for 170 hours. Two thousand working hours per year divided by 12 months per year is approximately equal to 170 hours per month.

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

(3) Exemptions from the Regulatory Requirements.

- (a) General Provision. The Department may, upon application or upon its own initiative, grant such exemptions or exceptions from the requirements of this Chapter as it determines are authorized by law and will not result in undue hazard to public health and safety or property.
- (b) U.S. Department of Energy Contractors and U.S. Nuclear Regulatory Commission Contractors. Any U.S. Department of Energy contractor or subcontractor and any U.S. Nuclear Regulatory Commission contractor or subcontractor of the following categories operating within this State are exempt from this Chapter to the extent that such contractor or subcontractor under his contract receives, possesses, uses, transfers, or acquires sources of radiation:
 - 1. Prime contractors performing work for the U.S. Department of Energy at U.S. government-owned or -controlled sites, including the transportation of sources of radiation to or from such sites and the performance of contract services during temporary interruptions of such transportation;
 - 2. Prime contractors of the U.S. Department of Energy performing research in, or development, manufacture, storage, testing, or transportation of, atomic weapons or components thereof;
 - 3. Prime contractors of the U.S. Department of Energy using or operating nuclear reactors or other nuclear devices in a United States government-owned vehicle or vessel; and
 - 4. Any other prime contractor or subcontractor of the U.S. Department of Energy or of the U.S. Nuclear Regulatory Commission when the Department and the Nuclear Regulatory Commission jointly determine:
 - (i) That the exemption of the prime contractor or subcontractor is authorized by law; and

- (ii) That, under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to public health and safety.
- (4) Records. Each licensee shall maintain records showing the receipt, transfer, and disposal of all sources of radiation. Additional record requirements are specified elsewhere in this Chapter.
- (5) Inspections.
 - (a) Each licensee shall afford the Department at all reasonable times opportunity to inspect sources of radiation and the premises and facilities wherein such sources of radiation are used or stored.
 - (b) Each licensee shall make available to the Department for inspection, upon reasonable notice, records maintained pursuant to this Chapter.
 - (c) The Department or its designated representative is authorized under the authority of O.C.G.A. 31-5-5(b) to classify as confidential and privileged such documents, reports, and other information and data obtained from persons, firms, corporations, municipalities, counties, and other public authorities and political subdivisions where such matters relate to:
 - 1. Trade secrets and commercial or financial information furnished to the Department on a privileged or confidential basis. Matters subject to this exemption are those that are customarily held in confidence by the originator. They include, but are not limited to:
 - (i) Information received in confidence, such as trade secrets, inventions, and proprietary data;
 - (ii) Technical reports and data, designs, drawings, specifications, formulas, or other types of proprietary information which are furnished to the Department or which are generated or developed by the Department or for the Department under contract.
 - 2. Personnel and medical files and similar files, the disclosure of which would constitute a clearly unwarranted invasion of personal privacy. Examples of files exempt from disclosure include, but are not limited to names or identifying information regarding individuals who have received exposure to radiation.
 - (d) Discovery of material qualified pursuant to 391-3-17-.01(5)(c) shall be subject to the statutory requirements found in O.C.G.A. 31-5-5.

- (6) Tests. Each licensee shall perform upon instructions from the Department, or shall permit the Department to perform, such reasonable tests as the Department deems appropriate or necessary, including, but not limited to, tests of:
- (a) Sources of radiation;
 - (b) Facilities wherein sources of radiation are used or stored;
 - (c) Radiation detection and monitoring instruments; and
 - (d) Other equipment and devices used in connection with utilization or storage of licensed sources of radiation.
- (7) Additional Requirements. The Department, by Rule or Regulation, and the Director by Order, may impose upon any licensee such requirements in addition to those established in this Chapter as it deems appropriate or necessary to minimize danger to public health and safety or property.
- (8) Violations.
- (a) An injunction or other court order may be obtained prohibiting any violation of the provisions of the Act, this Chapter, or any Order issued thereunder in accordance with Rule 391-3-17-.11. Any person who willfully violates any provision of the Act, this Chapter, or any Order issued thereunder may be guilty of a misdemeanor as provided by law. Violators of this Chapter may also be subject to civil penalties in accordance with O.C.G.A. 31-13-15.
 - (b) Any licensee, certificate of registration holder, applicant for a license or certificate of registration, employee of a licensee, certificate of registration holder or applicant; or any contractor (including a supplier or consultant), subcontractor, employee of a contractor or subcontractor of any licensee or certificate of registration holder or applicant for a license or certificate of registration, who knowingly provides to any licensee, applicant, certificate holder, contractor, or subcontractor, any components, equipment, materials, or other goods or services that relate to a licensee's, certificate holder's or applicant's activities in this part, may not:
 - 1. Engage in deliberate misconduct that causes or would have caused, if not detected, a licensee, certificate of registration holder, or applicant to be in violation of any Rule, Regulation, or Order; or any term, condition, or limitation of any license issued by the Department; or

2. Deliberately submit to the Department, a licensee, certificate of registration holder, an applicant, or a licensee's, certificate holder's or applicant's, contractor or subcontractor, information that the person submitting the information knows to be incomplete or inaccurate in some respect material to the Department.
- (c) A person who violates 8(b)1. or 8(b)2. may be subject to enforcement action in accordance with the provisions of Rule .11 of this Chapter.
- (d) For the purposes of 8(b)1., deliberate misconduct by a person means an intentional act or omission that the person knows:
 1. Would cause a licensee, certificate of registration holder or applicant to be in violation of any Rule, Regulation, or Order; or any term, condition, or limitation, of any license issued by the Department; or
 2. Constitutes a violation of a requirement, procedure, instruction, contract, purchase order, or policy of a licensee, certificate of registration holder, applicant, contractor, or subcontractor.
- (9) Impounding. The Department shall have the authority in the event of an emergency to impound or order the impounding of radioactive material in the possession of any person who is not equipped to observe or fails to observe the provisions of this Chapter or any Rules issued thereunder.
 - (a) Upon a showing that the emergency no longer exists and the owner of the radioactive material has demonstrated that he has achieved and is capable of maintaining compliance with the Act, the terms and conditions of his license, and all Rules, Regulations, and Orders of the Department, the Department may return the impounded radioactive material to its owner.
 - (b) In the event an owner cannot demonstrate his ability to achieve and maintain compliance with the Act, the terms and conditions of his license, and all Rules, Regulations, and Orders of the Department, the Department is authorized to seek a court order condemning such radioactive material and providing for its destruction or other disposition for the health and safety of the populace.
- (10) Severability. Should any section, paragraph, sentence, clause or phrase of this Chapter be declared unconstitutional or invalid for any reason, the remainder of this Chapter shall not be affected thereby.

(11) Units of Exposure and Dose.

- (a) As used in this Chapter, the unit of Exposure is the Coulomb per kilogram (C/kg). One Roentgen is equal to 2.58×10^{-4} Coulomb per kilogram of air.
- (b) As used in this Chapter, the units of dose are:
1. Gray (Gy) is the SI unit of absorbed dose. One Gray is equal to an absorbed dose of 1 Joule/kilogram (100 rad).
 2. Rad is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs/gram or 0.01 Joule/kilogram (0.01 Gy).
 3. Rem is the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor (1 rem = 0.01 Sv).
 4. Sievert is 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 multiplied by the quality factor (1 Sv = 100 rem).
- (c) As used in this Chapter, the quality factors for converting absorbed dose to dose equivalent are shown in Table I.

TABLE I

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 and high-speed electrons	1	1
Alpha particles, multiple-charged particles, fission fragments and heavy particles of unknown charge	20	0.05
Neutrons of unknown energy	10	0.1
High-energy protons	10	0.1

^(a)Absorbed dose in rad equal to 1 rem or the absorbed dose in Gray equal to 1 Sv.

- (d) If it is more convenient to measure the neutron fluence rate than to determine the neutron dose equivalent rate in Sievert per hour or rem per hour, as provided in (11)(c) of this Rule, 0.01 Sv (1 rem) of neutron radiation of unknown energies may, for purposes of this Chapter, 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 licensee may use the fluence rate per unit dose equivalent or the appropriate Q value from Table II to convert a measured tissue dose in Gray or rad to dose equivalent in Sievert or rem.

TABLE II
MEAN QUALITY FACTORS, Q, AND FLUENCE PER UNIT DOSE
EQUIVALENT FOR MONOENERGETIC NEUTRONS

	Neutron Energy (MeV)	Quality Factor ^(a) (Q)	Fluence per Unit Dose Equivalent ^(b) (neutrons cm ⁻² rem ⁻¹)	Fluence per Unit Dose Equivalent ^(b) (neutrons cm ⁻² Sv ⁻¹)
(thermal)	2.5 x 10 ⁻⁸	2	980 x 10 ⁶	980 x 10 ⁸
	1 x 10 ⁻⁷	2	980 x 10 ⁶	980 x 10 ⁸
	1 x 10 ⁻⁶	2	810 x 10 ⁶	810 x 10 ⁸
	1 x 10 ⁻⁵	2	810 x 10 ⁶	810 x 10 ⁸
	1 x 10 ⁻⁴	2	840 x 10 ⁶	840 x 10 ⁸
	1 x 10 ⁻³	2	980 x 10 ⁶	980 x 10 ⁸
	1 x 10 ⁻²	2.5	1010 x 10 ⁶	1010 x 10 ⁸
	1 x 10 ⁻¹	7.5	170 x 10 ⁶	170 x 10 ⁸
	5 x 10 ⁻¹	11	39 x 10 ⁶	39 x 10 ⁸
	1	11	27 x 10 ⁶	27 x 10 ⁸
	2.5	9	29 x 10 ⁶	29 x 10 ⁸
	5	8	23 x 10 ⁶	23 x 10 ⁸
	7	7	24 x 10 ⁶	24 x 10 ⁸
	10	6.5	24 x 10 ⁶	24 x 10 ⁸
	14	7.5	17 x 10 ⁶	17 x 10 ⁸
	20	8	16 x 10 ⁶	16 x 10 ⁸
	40	7	14 x 10 ⁶	14 x 10 ⁸
	60	5.5	16 x 10 ⁶	16 x 10 ⁸
	1 x 10 ²	4	20 x 10 ⁶	20 x 10 ⁸
	2 x 10 ²	3.5	19 x 10 ⁶	19 x 10 ⁸
	3 x 10 ²	3.5	16 x 10 ⁶	16 x 10 ⁸
	4 x 10 ²	3.5	14 x 10 ⁶	14 x 10 ⁸

^(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.

- (12) Units of Radioactivity. For purposes of this Chapter, activity is expressed in the SI unit of Becquerel (Bq) or in the special unit of Curie (Ci), or their multiples, or disintegrations or transformations per unit of time.
- (a) One Becquerel (Bq) = 1 disintegration or transformation per second.
 - (b) One Curie (Ci) = 3.7×10^{10} disintegrations or transformations per second = 3.7×10^{10} Becquerel (Bq) = 2.22×10^{12} disintegrations or transformations per minute.
- (13) Communications. All communications and reports concerning this Chapter, and applications filed thereunder should be addressed to the Georgia Department of Natural Resources/EPD, Radioactive Materials Program, at the current address or at 2 Martin Luther King Jr. Drive SE, Suite 1152 East Tower, Atlanta, Georgia, 30334-9000.

Authority O.C.G.A. 31-13-1 et seq.; Ga. L. 1964, pp. 499, 507, 566-575, as amended (Georgia Radiation Control Act)