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SUBCHAPTER 1. GENERAL PROVISIONS

7:28-1.1 Purpose and scope

(a) The purpose of this chapter is to prohibit and prevent the use or presence of unnecessary radiation in such a manner as to be, or tend to be, injurious or dangerous to the health of the people or the industrial or agriculture potentials of the State, or to the ecology of the State.

(b) This chapter applies to all persons and persons licensed or registered by the Department to receive, possess, use, transfer, install, handle, transport, store, or dispose of ionizing radiation producing machines, non-ionizing radiation producing sources, diffuse technologically enhanced naturally occurring radioactive materials, diffuse accelerator-produced radioactive materials, by-product, source, or certain special nuclear material or to operate a production or utilization facility under N.J.A.C. 7:28-51 through 60. The limits in this chapter do not apply to doses due to background radiation, to exposure of patients to radiation for the purpose of medical diagnosis or therapy, to exposure from individuals administered radioactive material and released under N.J.A.C. 7:28-55.1, or to exposure from voluntary participation in medical research programs.

(c) The regulations in this chapter establish standards for protection against ionizing radiation resulting from activities conducted under registrations or licenses issued by the Department.

(d) It is the purpose of the regulations in this chapter to control the receipt, possession, use, transfer, and disposal of licensed material, ionizing radiation producing machines, or non-ionizing radiation producing sources by any licensee or registrant in such a manner that the total dose or exposure to an individual (including doses resulting from licensed and unlicensed radioactive material and from radiation sources other than background radiation) does not exceed the standards for protection against radiation prescribed in the regulations in this chapter. However, nothing in this chapter shall be construed as limiting actions that may be necessary to protect health and safety.

7:28-1.2. Construction

These rules shall be liberally construed to permit the Department and its various agencies to discharge their statutory functions.

7:28-1.3 Practice where rules do not govern

The Commission may rescind, amend or expand these rules from time to time, in accordance with *N.J.S.A. 26:2D-7*, Chapter 116, Public Laws of 1958, as amended.

7:28-1.4 Definitions

(a) The following words and terms, when used in this chapter, shall have the following meanings unless the context clearly indicates otherwise. Additional words and terms applicable to the chapter, incorporated from 10 CFR 20, are duplicated at NJAC 7:28-6.

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Words and terms applicable to a specific subchapter only, will be found in that subchapter.

1. General Terms:

“Act” means the New Jersey Radiation Protection Act, Chapter 116, Public Laws of New Jersey 1958, as amended, cited as N.J.S.A. 26:2D-1 et seq.

“Agreement State” means any state with which the United States Nuclear Regulatory Commission has entered into an effective agreement under subsection 274b of the Atomic Energy Act of 1954, as amended.

“Annually” means occurring once per year at intervals of not less than 51 consecutive weeks nor more than 53 consecutive weeks.”

“Area” means a bounded space such as a room, floor, building, plant or any designated geographical entity having physical or imaginary boundaries.

“Average dose rate” means an integrated or accumulated dose of radiation divided by the time over which the integration or accumulation took place or by a specified length of time.

“Commission” means the New Jersey Commission on Radiation Protection.

“Dead-man switch” means a switch which can be kept closed only when the operator applies continuous pressure.

“Department” means the New Jersey Department of Environmental Protection.

“Dose rate” means dose per unit time.

“Emergency exposure” means an exposure to radiation of an emergency worker during rescue or other emergency operations.

“Emergency worker” means a member of the owner’s staff or of a public voluntary or governmental agency engaged in safety or other emergency operations.

“Exemption” means the administrative relief from the requirements of a substantive rule.

“Healing art” means the practice of any branch of medicine or surgery, any method of diagnosis of human ailment, disease, pain, injury, deformity, mental or physical condition.

“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.

“Installation” means a radiation source, with its associated equipment, and the area in which it is housed.

“Instructed individual” means an individual who has received appropriate instructions as to the safe means and methods of performing work with or near radiation sources.

“Ionizing radiation” means any form of radiation which has the capability of ionizing the medium through which it is passing.

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“Maximum permissible dose” means the maximum dose to which the body or a particular part of the body of a person shall be permitted to be exposed continuously or intermittently in a stated period of time.

“Nonionizing radiation” means any form of radiation which does not have the capability of ionizing the medium through which it is passing.

“Owner” means a person who has title to a radiation source or who possesses a radiation source as a lessee, bailee or pursuant to the terms of a license issued by the Department, by a Federal agency, or by any other state.

“Personnel-monitoring equipment” means devices designed to be worn or carried by an individual for the purpose of measuring the dose received; for example, film badges, pocket chambers, pocket dosimeters, and thermoluminescent dosimeters.

“Qualified individual” means an individual suited by training and experience to perform dependable radiation surveys and to determine the degree of radiation hazard.

“Radiation” includes any or all of the following: electromagnetic radiation including radiofrequency, microwave, infrared, visible, ultraviolet, x-ray, or gamma ray; sonic, infrasonic, or ultrasonic waves; and particle radiation including alphas, betas, high energy electrons, neutrons, protons, and other atomic or nuclear particles.

“Research and development” means theoretical analysis, exploration, or experimentation; or the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental production and testing of models, devices, equipment, materials and processes. “Research and development” does not include the internal or external administration of radioactive material, or of radiation, to human beings.

“Semi-annually” means occurring twice per year at intervals of not less than 25 consecutive weeks, nor more than 27 consecutive weeks.

“Shielding” means any material introduced into the path of radiation to reduce the radiation level.

“Source of radiation: means a material, equipment or machine emitting or capable of emitting radiation.

“State” means the State of New Jersey.

“Unnecessary radiation” means the use of nonionizing or ionizing radiation in such a manner as to be, or tend to be, injurious or dangerous to the health of the people or the industrial or agricultural potentials of the State, as defined in the Radiation Protection Act,

“User” means any individual who personally utilizes or manipulates a source of radiation.

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“Year” means the period of time beginning in January used to determine compliance with the provisions of this part. 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.

2. Ionizing radiation terms:

"Beam-monitoring device" means a device in the useful beam to indicate the relative output of a radiation-producing machine.

“Bioassay” (radiobioassay) 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.

“Contamination” means radioactive contamination.

"Diagnostic-type protective tube housing" means x-ray tube housing so constructed that the leakage radiation at a distance of one meter from the target cannot exceed 100 milliroentgen in one hour when the tube is operated at any of its specified ratings.

“Diffuse” means a radionuclide that has become concentrated, but not for the purpose of use in commercial, medical, or research activities.

“Domestic sewage” means waste and wastewater from humans or household operations that is discharged to or otherwise enters a treatment works.

“Domestic treatment works” or “DTW” means all publicly owned treatment works as well as any other treatment works processing primarily domestic sewage and pollutants together with any ground water, surface water, storm water or process wastewater that may be present.

“Dosimetry processor” means an individual or organization that processes and evaluates individual monitoring equipment in order to determine the radiation dose delivered to the equipment.

"Human use" means the deliberate internal and external administration of radiation or radioactive material to human beings.

"Ionizing radiation-producing machine" means a machine or device capable of generating radiation, such as x-ray producing machines, particle accelerators, high-voltage rectifiers, high-voltage projection equipment, electron microscopes and other types of high-voltage machines.

"Leakage radiation" means all radiation coming from within an ionizing radiation-producing machine except the useful beam.

"NARM" means any naturally occurring or accelerator produced radioactive material.

"NORM" means any naturally occurring radioactive material.

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“Protective Barrier” means a barrier of radiation-absorbing material used to reduce radiation exposure. The types of protective barriers are as follows:

1. “Primary protective barrier” means the material, excluding filters, intercepting the useful beam for protection purposes to reduce the radiation exposure so that it does not exceed two millirems per hour.
2. “Secondary protective barrier” means a barrier sufficient to attenuate the stray radiation to reduce radiation exposure so that it does not exceed two millirems per hour.

"Radioactive material" means a natural or artificially produced substance, solid, liquid or gas which emits ionizing radiation spontaneously.

"Radiographer" means any individual who is in attendance at a site where ionizing radiation-producing machines are being used and who uses or supervises their use in industrial radiographic operations and who is responsible to the owner for assuring compliance with the requirements of this chapter.

"Radiographer's assistant" means any individual who, under the personal supervision of a radiographer, uses ionizing radiation-producing machines, related handling tools, or survey instruments in industrial radiography.

"Radiography" means the examination of humans or animals, or of the structure of materials by non-destructive methods, utilizing ionizing radiation-producing machines. This term is not intended to apply to techniques such as electron microscopy or x-ray diffraction.

"Registrant" means a person who is required to register an ionizing radiation-producing machine source of radiation with the Department pursuant to this chapter.

"Roentgen" means the quantity of x or gamma radiation such that the associated corpuscular emission per .001293 grams of air produces, in air, ions carrying one electrostatic unit of quantity of electricity of either sign.

"Secondary protective barrier" means a barrier intended to attenuate ionizing radiation (other than the useful beam) to the required degree.

"Sewage Sludge" means the solid, semi-solid, or liquid residue generated by the processes of a domestic treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and any material derived from sewage sludge.

"Shielded position" means the location within the radiographic-exposure device or storage container which by manufacturer's design, is the proper location for storage of the sealed source.

"Storage container" means a device in which radioactive materials or sources are transported or stored.

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"Technologically enhanced naturally occurring radioactive materials" or "TENORM" means any naturally occurring radioactive materials whose radionuclide concentrations or potential for human exposure have been increased by any human activities.

"Total filtration" means the filtration produced by all materials inserted in the useful beam including the materials comprising the tube and its housing, any measured devices in the beam which act as a filter, and any material purposely placed in the beam as filters.

"Useful beam" means that part of the radiation beam which passes through the window, aperture cone or other collimating device of the tube housing.

"Water treatment facility" means an entity that applies a treatment device to drinking water for the purpose of reducing contaminants. The entity may be a community water system or non-community water system as defined by the EPA in 40 CFR 141.

"X-ray tube" means an electron tube which is designed for the conversion of electrical energy into x-ray energy.

3. Non-ionizing radiation terms:

"Electric field strength" means a field vector quantity that represents the force on an infinitesimal unit positive test charge at a point divided by that charge. The electric field strength is expressed in units of volts per meter (V/m).

"Far field" means a region associated with a radiating source or structure in which the field per unit solid angle is constant. In this region, the field has a predominantly plane wave character, that is, locally very uniform distributions of electric field strength and magnetic field strength in planes perpendicular to the direction of propagation. Generally, the far field region begins several wavelengths distant from the source.

"Fixed radio frequency device" means a device operating at a specific location for a period of 30 days or more.

"Magnetic field strength" means a field vector that is equal to the product of the magnetic flux density and the reciprocal of the permeability. Magnetic field strength is expressed in units of amperes per meter (A/m).

"Microwave oven" means an oven which is designed to heat, cook or dry food through the applications of radio frequency electromagnetic energy, and which is designed to operate at a frequency of 916 MHz or 2.45 GHz.

"Near field" means a region near a radiating source or structure in which the electric and magnetic fields do not have a substantially plane wave character, but vary considerably from point to point. The extent of the near field is only vaguely defined and depends on several factors the most important of which is the size of the radiating structure with respect to the wavelength of the emitted electromagnetic energy. In general, this distance extends to at least five wavelengths from the radiating device.

"Power density" means the rate of energy transported into a small sphere divided by the cross-sectional area of that sphere. Power density is expressed in units of watts per

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meter squared (W/m^2), or for convenience milliwatts per centimeter squared (mW/cm^2).

"Power density, plane wave equivalent" means a quantity that is associated with any electromagnetic wave that is equal in magnitude to the power density of a plane wave that has the same electric or magnetic field strength.

"Radiating device" means the antenna, leakage port, or any other part of a device that emits radio frequency electromagnetic energy.

"Radio frequency" means the frequency range of 300 kilohertz (kHz) to 100 gigahertz (GHz).

"Radio frequency device" means any stationary device, machine, equipment or installation which is capable of generating a radio frequency electromagnetic field. This does not include devices which are marketed as consumer products, including, but not limited to citizens band radios, remote controlled toys, remote controlled garage door openers, mobile radio transmitter under authorization of the Federal Communications Commission or any other device specifically exempted by the Commission on Radiation Protection as not presenting a potential hazard or harm to a worker or the public.

"Radio frequency protection guide (RFPG)" means the mean squared electric field strength, the mean squared magnetic field strength, and the equivalent plane wave power density which shall not be exceeded. The RFPG is an upper limit of exposure. Exposure to levels slightly in excess of the RFPG is not harmful, however, such exposure is not desirable. In all cases the exposure shall be reduced to values that are as low as reasonably achievable.

"Specific absorption rate (SAR)" means the time derivative of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ).

$$\text{SAR} = \frac{dW}{dt \, dm} \quad \rho \quad \frac{dW}{dt \, \rho \, dV}$$

The specific absorption rate is expressed in units of watts per kilogram (W/kg). In view of the proliferation of terms for describing the electromagnetic radiation conditions in biological materials and the discipline oriented interpretation of these terms, it is recommended that the name "specific absorption rate" be used for the quantity defined here, rather than such a name as "absorbed power density per unit mass".

7:28-1.5. Communications

(a) Communications concerning this chapter, or matters relating to radiation protection, may be addressed to the New Jersey Department of Environmental Protection, Radiation Protection and Release Prevention Element, PO Box 415, Trenton, New Jersey 08625-0415. Telephone: (609) 984-5636, Fax: (609) 633-2210. The physical location of the office is 25 Arctic Parkway, Ewing, New Jersey 08638. Applications and forms may be obtained from the website at <http://www.state.nj.us/dep/rpp/index.htm>.

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(b) All emergency notification of incidents involving sources of radiation in this State shall be immediately reported to either one of the following agencies:

1. Radiation Protection and Release Prevention Element

New Jersey Department of Environmental Protection

25 Arctic Parkway

Ewing, NJ 08638

Telephone: (609) 984-5462

Hours: 8:00 A.M. to 5:00 P.M. daily, except Saturday, Sunday, and Holidays

After hours and weekends toll free: 1 (877) 927-6337 (1 (877) WARN-DEP)

2. Communications Officer

New Jersey State Police Office of Emergency Management

West Trenton, NJ 08628

Telephone: 609-882-2000

Hours: 24 hours, seven days a week