

STATE OF ILLINOIS  
**DEPARTMENT OF NUCLEAR SAFETY**

1035 OUTER PARK DRIVE • SPRINGFIELD, ILLINOIS 62704  
217-785-9900 • 217-782-6133 (TDD)

George H. Ryan  
Governor

Thomas W. Ortziger  
Director

January 25, 2000

Mr. Fred Combs  
Deputy Director, Office of State Programs  
U.S. Nuclear Regulatory Commission  
Mail Stop 3D23  
Washington, DC 20555-0001

Dear Mr. Combs:

In accordance with OSP Procedure SA-201, Review of State Regulations, the Illinois Department of Nuclear Safety (Department) is hereby transmitting the final version of 32 Ill. Adm. Code 310, General Provisions. Enclosed with this letter please find the summary of changes made from the original First Notice, and a complete copy of Part 310, General Provisions. The proposed changes to this Part became effective January 1, 2000.

Your letter reviewing the proposed changes to Part 310, dated November 24, 1999, included a comment regarding our inclusion of federal entities under the definition of "person" in the proposed rule. As stated in the attachment of your letter, this language establishes a framework for inclusion of federal entities should this option become available to Illinois. I would also like to confirm that it is our intent to delete the term "generally applicable environmental radiation standards" from 32 Ill. Adm. Code 340, rather than add a definition.

Since your letter included a copy of the Regulation Assessment Tracking System (RATS) Data Sheet, I would like to request a modification to the entry for exempt distribution of C-14. RATS ID 1997-7 should be updated to indicate that the rule became final on July 27, 1998. I have included a copy of the appropriate Section of 32 Ill. Adm. Code 330 showing the final changes.

I will continue to review the RATS Data Sheet for more updates. If you have any questions, please feel free to contact me at 217-785-9931 or via e-mail at [k\\_allen@idns.state.il.us](mailto:k_allen@idns.state.il.us).

Sincerely,



Kathy Allen  
Senior Project Manager

Cc: Jim Lynch, Region III  
Enclosures (First Notice Changes, Part 310, and Part 330.40)

SP07 | 1

## FIRST NOTICE CHANGES

**AGENCY:** Department of Nuclear Safety

**RULEMAKING:** General Provisions, 32 Ill Code 310; 23 Ill. Reg. 9627

**CHANGES:**

1. In Section 310.20, lines 130 and 135, reinsert subsection labels.
2. In Section 310.20, lines 516 and 522, reinsert subsection labels.
3. In Section 310.20, line 268, change “optically stimulated dosimeters” to “optically stimulated luminescence dosimeters”.
4. In Section 310.20, line 309, delete “1998” and reinsert “1994”.

The Department of Nuclear Safety accepts all editorial changes detailed in the First Notice Line Numbered Version received from the staff of the Joint Committee on Administrative Rules except as noted in this Attachment A.

**TITLE 32: ENERGY**  
**CHAPTER II: DEPARTMENT OF**  
**NUCLEAR SAFETY**  
**SUBCHAPTER b: RADIATION PROTECTION**

**PART 310**  
**GENERAL PROVISIONS FOR RADIATION**  
**PROTECTION**

Section	
310.10	Scope
310.15	Incorporations by Reference
310.20	Definitions
310.30	Exemptions
310.40	Records
310.50	Inspections
310.60	Tests
310.70	Additional Requirements
<b>310.74</b>	<b>Cost Assessment</b>
310.75	Emergency Response Cost Recovery
310.80	Violations
310.81	Policy for Assessment of Civil Penalties
310.82	Procedures for Assessment of Civil Penalties
310.90	Impounding
310.100	Prohibited Uses
310.110	Communications
310.120	Plans and Specifications
310.140	Units of Exposure and Radiation Dose
310.150	Units of Activity

**AUTHORITY:** Implementing and authorized by the Radiation Protection Act of 1990. [420 ILCS 40]

**SOURCE:** Filed April 20, 1974 by the Department of Public Health; transferred to the Department of Nuclear Safety by P.A. 81-1516, effective December 3, 1980; codified at 7 Ill. Reg. 15657; amended at 10 Ill. Reg. 17259, effective September 25, 1986; amended at 15 Ill. Reg. 10604, effective July 15, 1991; amended at 17 Ill. Reg. 18472, effective January 1, 1994; amended at 20 Ill. Reg. 15978, effective December 9, 1996; amended at 23 Ill. Reg. 14454, effective January 1, 2000.

**Note:** In this Part, superscript numbers or letters are denoted by parentheses, subscript are denoted by brackets.

**Section 310.10 Scope**

Except as otherwise specifically provided, this Part applies to all persons who receive, possess, use, transfer, own, or acquire any source of radiation within the State of Illinois; provided, however, that nothing in 32 Ill. Adm. Code 310, 320, 330, 331, 332, 335, 340, 341, 350, 351, 400, 401 and 601 shall apply to any person to the extent such person is subject to regulation by the U.S. Nuclear Regulatory Commission (NRC).

**AGENCY NOTE:** Attention 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 an agreement between the State and the NRC and to 10 CFR 150 of the Commission's regulations.

(Source: Amended at 17 Ill. Reg. 18472, effective January 1, 1994)

**Section 310.15 Incorporations by Reference**

All rules, standards and guidelines of agencies of the United States or nationally recognized organizations or associations that are incorporated by reference in this Part are incorporated as of the date specified in the reference and do not include any later amendments or editions. Copies of these rules, standards and guidelines that have been incorporated by reference are available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois.

(Source: Amended at 23 Ill. Reg. 14454, effective January 1, 2000)

**Section 310.20 Definitions**

As used in 32 Ill. Adm. Code: Chapter II, Subchapters b and d, these terms have the definitions set forth below. Additional definitions used only in a certain Part will be found in that Part.

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

“Accelerator” (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 1 million electron volts (MeV).

“Accelerator-produced material” means any material made radioactive by a particle accelerator.

“Act” means the Radiation Protection Act of 1990 (the Act) [420 ILCS 40].

“Activity” means the rate of disintegration (transformation) or decay of radioactive material. The units of activity are the becquerel (Bq) and the curie (Ci).

“Adult” means an individual 18 or more years of age.

## §§310.20

“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 (42 USC 2021(b) et seq.).

“Airborne radioactive material” means any radioactive material dispersed in the air in the form of dusts, fumes, particulates, mists, vapors or gases.

“Airborne radioactivity area” means any room, enclosure or operating area in which airborne radioactive material, composed wholly or partly of licensed material, exists in concentrations:

in excess of the derived air concentrations (DAC's) specified in Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1998, exclusive of subsequent amendments or editions; or

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.

“As low as is reasonably achievable” (ALARA) means making every reasonable effort to maintain exposures to radiation as far below the dose limits in 32 Ill. Adm. Code: Chapter II, Subchapters b and d as is practical consistent with the purpose for which the licensed or registered 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.

“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 global fallout as it exists in the environment from the testing of nuclear explosive devices. Background radiation does not include radiation from radioactive materials regulated by the Department.

“Becquerel” (Bq) means the SI unit of activity. One becquerel (Bq) is equal to 1 disintegration (transformation) per second (dps or tps).

“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.

“Brachytherapy” means a method of radiation therapy in which sealed sources are used to deliver a radiation dose at a distance of less than 6 centimeters, by surface, intracavitary or interstitial application.

“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 any ore processed primarily for its source material content, including discrete surface wastes resulting from underground solution extraction processes but not including underground ore bodies depleted by such solution extraction processes. [420 ILCS 40/4(a-5)]

“Calendar quarter” means not less than 12 consecutive weeks nor more than 14 consecutive weeks. The first calendar quarter of each year shall begin in January and subsequent calendar quarters shall be so arranged such that no day is included in more than one calendar quarter and no day in any one year is omitted from inclusion within a calendar quarter. No licensee or registrant shall change the method observed by him for determining calendar quarters except at the beginning of a year.

“Calibration” means the determination of:

the response or reading of an instrument relative to a series of known radiation values over the range of the instrument; or

the strength of a source of radiation relative to a standard.

“CFR” means Code of Federal Regulations.

“Chelating Agent” means amine polycarboxylic acids (e.g., EDTA, DTPA), hydroxy-carboxylic acids and polycarboxylic acids (e.g., citric acid, carboic acid and glucinic acid).

“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.

“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.

“Committed effective dose equivalent” (H[E,50]) means 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 ( $H[E,50] = \text{SUM } w[T]H[T,50]$ ).

“Curie” means a unit of quantity of radioactivity. One curie (Ci) is that quantity of radioactive material which decays at the rate of  $3.7 \times 10^{10}$  disintegrations (transformations) per second (dps or tps).

“Declared pregnant woman” means any woman who has voluntarily informed her employer, in writing, of her pregnancy.

“Deep dose equivalent” (H[d]) means the dose equivalent at a tissue depth of 1 centimeter (1000 milligrams per square centimeter) from external whole-body exposure.

“Densitometer” means a device that is used to provide a quantitative measurement of the optical density of x-ray film to determine the response of the film to exposure and development.

“Department” means Illinois Department of Nuclear Safety.

“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.

“Director” means *the Director of the Department of Nuclear Safety*. [420 ILCS 40/4(c)]

“Dose” (radiation dose) means either absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, total organ dose equivalent or total effective dose equivalent.

“Dose equivalent” (H[T]) means the product of the absorbed dose in tissue, quality factor and all other necessary modifying factors (e.g., a distribution factor for non-uniform deposition) at the location of interest. The units of dose equivalent are the sievert (Sv) and the rem.

“Dose limits” (limits) means the permissible upper bounds of radiation doses established by, or in accordance with, 32 Ill. Adm. Code: Chapter II, Subchapters b and d.

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

“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 ( $H[E] = \sum w[T]H[T]$ ).

“Embryo/fetus” means the developing human organism from conception until the time of birth.

“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.

“Exposure” means:

the quotient of dQ divided by dm where “dQ” is the absolute value of the total charge of the ions of one sign produced in air when all the electrons (negatrons and positrons) liberated by photons in a volume element of air having mass “dm” are completely stopped in air. (See Section 310.140 of this Part for SI unit coulomb per kilogram (C/kg) and the special unit roentgen (R).); or

irradiation by ionizing radiation or radioactive material.

AGENCY NOTE: The context makes clear which is the appropriate definition.

“Exposure rate” means the exposure per unit of time, such as roentgen per minute (R/min) and milliroentgen per hour (mR/h).

“External dose” means that portion of the dose equivalent received from any source of radiation outside the body.

“Extremity” means a hand, elbow, arm below the elbow, foot, knee and leg below the knee.

“Eye dose equivalent” or “lens dose equivalent” means the external dose equivalent to the lens of the eye at a tissue depth of 0.3 centimeter (300 milligrams per square centimeter).

“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.

“Gray” (Gy) means the SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 joule per kilogram (J/kg) (100 rad).

“Healing Arts” means the art or science or group of arts or sciences dealing with the prevention and cure or alleviation of human ailments, diseases or infirmities, and has the same meaning as “medicine” when the latter term is used in its comprehensive sense.

“High radiation area” means any area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 1 mSv (0.1 rem) in 1 hour at 30 centimeters from any source of radiation or from any surface that the radiation penetrates.

## §§310.20

“Human use” means the internal or external administration of radiation or radioactive materials to human beings.

“Individual” means any human being.

“Individual monitoring” means the assessment of:

Dose equivalent by the use of individual monitoring devices or by the use of survey data; or

Committed effective dose equivalent by bioassay or by determination of the time-weighted air concentrations to which an individual has been exposed (i.e., DAC-hours). (For the definition of DAC-hours, see 32 Ill. Adm. Code 340.30.)

“Individual monitoring devices” (personnel dosimeter or dosimeter) means devices designed to be worn by a single individual for the assessment of dose equivalent. Examples of individual monitoring devices are film badges, thermoluminescence dosimeters (TLDs), optically stimulated luminescence dosimeters (OSLs), pocket ionization chambers, personal air sampling devices and electronic dosimeters (e.g., silicon diode dosimeters).

“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.

“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.

“Internal dose” means that portion of the dose equivalent received from radioactive material taken into the body.

“Lens dose equivalent” (see “Eye dose equivalent”)

“License” means any license issued by the Department in accordance with 32 Ill. Adm. Code: Chapter II, Subchapters b and d.

“Licensed material” means radioactive material received, possessed, used, transferred or disposed of under a general or specific license issued by the Department.

“Licensee” means any person who is licensed by the Department in accordance with 32 Ill. Adm. Code: Chapter II, Subchapters b and d.

“Licensing State” means any state which has been provisionally or finally designated as such by the Conference of Radiation Control Program Directors, Inc., which reviews state regulations to establish equivalency with the Suggested State Regulations and ascertains whether a state has an effective program for control of naturally occurring or accelerator-produced radioactive material (NARM). The

Conference will designate as licensing states those states with regulations for control of radiation relating to, and an effective program for the regulatory control of (NARM).

“Lost or missing source of radiation” means any licensed or registered source of radiation whose location is unknown. This definition includes, but is not limited to, radioactive material that has been shipped but has not reached its planned destination and whose location cannot be readily traced in the transportation system.

“Major processor” means a person, other than medical programs, universities, industrial radiography services or wireline service operations, who is licensed to process, handle or manufacture radioactive material as unsealed sources in quantities exceeding the quantities specified in Appendix C to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, by a factor of at least 10(3), or radioactive material as sealed sources in quantities exceeding the quantities specified in Appendix C to 10 CFR 20.1001 - 20.2401 by a factor of at least 10(10).

“Member of the public” means any individual, except an individual who is performing assigned duties for the licensee or registrant involving exposure to sources of radiation.

“Minor” means an individual less than 18 years of age.

“Monitoring” (radiation monitoring or radiation protection 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.

“NARM” means any naturally occurring or accelerator-produced radioactive material. It does not include byproduct, source or special nuclear material.

“Natural radioactivity” means radioactivity of naturally occurring nuclides.

“Nuclear Regulatory Commission” (NRC) means the U.S. Nuclear Regulatory Commission or its duly authorized representatives.

“Occupational dose” means the dose received by an individual in the course of employment in which the individual's assigned duties for the licensee or registrant involve exposure to sources of radiation. Occupational dose does not include dose received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released as authorized by the Department, from voluntary participation in medical research programs, or as a member of the public.

"Operator" means *an individual, group of individuals, partnership, firm, corporation, association, or other entity conducting the business or activities carried on within a radiation installation.* [420 ILCS 40/4(d-7)]

"Package" means the packaging, together with its radioactive contents, as presented for transport.

"Packaging" means the assembly of components necessary to ensure compliance with the packaging requirements of 32 Ill. Adm. Code 341. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding and devices for cooling or absorbing mechanical shocks. The vehicle, tie down system and auxiliary equipment may be designated as part of the packaging.

"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 agency of the foregoing, other than the United States Nuclear Regulatory Commission, or any successor thereto, and other than federal government agencies licensed by the United States Nuclear Regulatory Commission, or any successor thereto.* "Person" also includes a federal entity (and its contractors) if the federal entity agrees to be regulated by the State or as otherwise allowed under federal law. [420 ILCS 40/4(e)]

"Personnel monitoring equipment" (see "Individual monitoring devices").

"Pharmacist" means an individual licensed by the State pursuant to the Pharmacy Practice Act of 1987 [225 ILCS 85] to compound and dispense drugs, prescriptions and poisons.

"Physician" means an individual licensed to practice a treatment of human ailments by virtue of the Medical Practice Act of 1987 [225 ILCS 60], the Illinois Dental Practice Act [225 ILCS 25] or the Podiatric Medical Practice Act of 1987 [225 ILCS 100], who may use radiation for therapeutic, diagnostic or other medical purposes within the limits of the individual's licensure.

"Protective apron" means any apron made of radiation attenuating materials, at least 0.25 millimeter lead equivalent, that may be used to reduce exposure to radiation.

"Public dose" means the dose received by a member of the public from sources of radiation from licensed or registered operations. Public dose does not include occupational dose, or dose received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released as authorized by the Department, or from voluntary participation in medical research programs.

"Qualified engineering expert" means any person qualified under the Illinois Architecture Practice Act of 1989 [225 ILCS 305], the Structural Engineering Licensing Act of 1989 [225 ILCS 340] and/or any required combination thereof.

"Quality factor" (Q) means the modifying factor (listed in Section 310.140, Tables 1 and 2 of this Part) that is used to derive dose equivalent from absorbed dose.

"Rad" means the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs per gram or 0.01 joule per kilogram (J/kg) (0.01 Gy).

"Radiation" (ionizing radiation) means *gamma rays and x-rays, alpha and beta particles, high-speed electrons, neutrons, protons, and other nuclear particles, or electromagnetic radiations capable of producing ions directly or indirectly in their passage through matter; but does not include sound or radio waves, or visible, infrared or ultraviolet light.* [420 ILCS 40/4(f)]

"Radiation area" means an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.05 mSv (0.005 rem) in 1 hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates.

"Radiation dose" (see "Dose").

"Radiation emergency" means *the uncontrolled release of radioactive material from a radiation installation which poses a potential threat to the public health, welfare and safety.* [420 ILCS 40/4(f-5)]

"Radiation Installation" is *any location or facility where radiation machines are used or where radioactive material is produced, transported, stored, disposed or used for any purpose,* [420 ILCS 40/4(g)] except where such radioactive materials or facility are subject to regulation by the NRC.

"Radiation machine" means *any device that produces radiation when in use* [420 ILCS 40/4(h)] except those which produce radiation only from radioactive materials.

"Radiation safety officer" means an individual who has the knowledge and responsibility to apply appropriate radiation protection regulations and has been assigned such responsibility by the licensee or registrant.

"Radioactive material" means *any solid, liquid, or gaseous substance which emits radiation spontaneously.* [420 ILCS 40/4(i)]

"Radioactivity" means the disintegration (transformation) of unstable atomic nuclei by the emission of radiation.

"Radiobioassay" (see "Bioassay").

## §§310.20

“Registrant” means any person who is registered with the Department and is legally obligated to register with the Department pursuant to the Radiation Protection Act of 1990 [420 ILCS 40] and 32 Ill. Adm. Code 320.10.

“Registration” means registration with the Department in accordance with 32 Ill. Adm. Code 320.10.

“Regulations of the U.S. Department of Transportation” (U.S. DOT) means the regulations in 49 CFR 100-189, revised as of October 1, 1996, exclusive of any subsequent amendments or editions.

“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 Sv).

“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 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.

“Restricted area” means any area access to which is limited by the licensee or registrant for purposes of protecting individuals against undue risks from exposure to sources of radiation. Restricted area shall not include areas used for residential quarters, but separate rooms in a residential building may be set apart as a restricted area.

“Roentgen” means the special unit of exposure. One roentgen (R) equals  $2.58 \times 10^{-4}$  coulombs per kilogram (C/kg). (See “Exposure” and Section 310.140 of this Part.)

“Sealed source” means any device containing radioactive material to be used as a source of radiation which has been constructed in such a manner as to prevent the escape of any radioactive material.

“Sensitometer” means a device that is used to test the setup and stability of film processing procedures and equipment by providing a standard pattern of light exposure of x-ray film.

“Shallow dose equivalent” (H[S]), which applies to the external exposure of the skin or an extremity, means the dose equivalent at a tissue depth of 0.007 centimeter (7 milligrams per square centimeter) averaged over an area of 1 square centimeter.

“SI” means the abbreviation for the International System of Units.

“Sievert” (Sv) 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).

“Source material” means:

uranium or thorium, or any combination thereof, in any physical or chemical form; or

ores which 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.

“Source of radiation” means any radioactive material or any device or equipment emitting, or capable of producing, radiation.

“Special form radioactive material” means radioactive material that satisfies the following conditions:

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

The piece or capsule has at least one dimension not less than 5 millimeters (0.197 inch); and

It satisfies the test requirements specified in 10 CFR 71.75 and 71.77, revised as of January 1, 1998, exclusive of subsequent amendments or editions, except that special form radioactive material designed or constructed prior to July 1, 1985 need only meet the requirements of 10 CFR 71.75 and 71.77 in effect on June 30, 1983.

“Special nuclear material” means: (1) plutonium, uranium 233, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Department declares by order to be special nuclear material after the United States Nuclear Regulatory Commission, or any successor thereto, has determined the material to be such, but does not include source material; or (2) any material artificially enriched by any of the foregoing, but does not include source material. [420 ILCS 40/4(1)]

“Special nuclear material in quantities not sufficient to form a critical mass” means uranium enriched in the isotope U-235 in quantities not exceeding 350 grams of contained U-235; U-233 in quantities not exceeding 200 grams; plutonium in quantities not exceeding 200 grams; or any combination of them, except source material, 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 one. For example, the following quantities in combination would not exceed the limitation and are within the formula:

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

“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. Such an evaluation includes, but is not limited to, measurements or calculations of levels of radiation, or concentrations or quantities of radioactive material present.

“Test” means the process of verifying compliance with an applicable regulation.

“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.

“Total organ dose equivalent” (TODE) means the sum of the deep dose equivalent and the committed dose equivalent to the organ receiving the highest dose as described in 32 Ill. Adm. Code 340.1160(a)(6).

“Unrefined and unprocessed ore” means ore in its natural form prior to any processing, such as grinding, roasting, beneficiating or refining.

“Unrestricted area” means any area access to which is not controlled by the licensee or registrant for purposes of protection of individuals from exposure to radiation and radioactive material, and any area used for residential quarters.

AGENCY NOTE: Licensees or registrants may control access to certain areas for purposes other than radiation protection, but such action does not affect whether the areas are unrestricted areas as defined in this Part.

“Uranium fuel cycle” means the operations of milling of uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity by a light-water-cooled nuclear power plant using uranium fuel and reprocessing of spent uranium fuel to the extent that these activities directly support the production of electrical power for public use. Uranium fuel cycle does not include mining operations, operations at waste disposal sites, transportation of radioactive material in support of these operations and the

reuse of recovered non-uranium special nuclear and byproduct materials from the cycle.

“U.S. Department of Energy” means the agency created by the Department of Energy Organization Act (established by P.L. 95-91, 91 Stat. 565, 42 USC 7101 et seq.), to the extent that the Department of Energy, or its duly authorized representatives, 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 (P.L. 93-438, 88 Stat. 1233 at 1237, 42 USC 5814) and retransferred to the Secretary of Energy pursuant to section 301(a) of the Department of Energy Organization Act (P.L. 95-91, 91 Stat. 565 at 577-578, 42 USC 7151).

“Very high radiation area” means an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 5 Gy (500 rad) in 1 hour at 1 meter from a source of radiation or from any surface that the radiation penetrates.

AGENCY NOTE: For very high doses received at high dose rates, units of absorbed dose (e.g., gray and rad) are appropriate rather than units of dose equivalent (e.g., sievert and rem).

“Waste handling licensee” means a person licensed by the NRC, the Department, an Agreement State or a Licensing State to receive radioactive wastes for storage, treatment, or both storage and treatment prior to disposal as well as any person licensed to receive radioactive waste for disposal away from the point of generation.

“Week” means 7 consecutive days starting on Sunday.

“Whole body” means, for purposes of external exposure, head, trunk (including male gonads), arms above the elbow or legs above the knee.

“Worker” means any individual engaged in work under a license or registration issued by the Department and controlled by a licensee or registrant, but does not include the licensee or registrant.

“Working level” (WL) means any combination of short-lived radon daughters in 1 liter of air that will result in the ultimate emission of  $1.3 \times 10^5$  MeV of potential alpha particle energy. The short-lived radon daughters are for radon-222: polonium-218, lead-214, bismuth-214 and polonium-214; and for radon-220: polonium-216, lead-212, bismuth-212 and polonium-212.

## §§310.20-50

“Working level month” (WLM) means an exposure to 1 working level (WL) for 170 hours. (2,000 working hours per year divided by 12 months per year is approximately equal to 170 hours per month.)

“Year” means the period of time beginning in January used to determine compliance with the provisions of 32 Ill. Adm. Code: Chapter II, Subchapters b and d. The licensee or registrant may change the starting date of the year used to determine compliance by the licensee or registrant provided that the decision to make the change is made not later than December 31 of the previous year. If a licensee or registrant changes a year, the licensee or registrant shall assure that no day is omitted or duplicated in consecutive years.

(Source: Amended at 23 Ill. Reg. 14454, effective January 1, 2000)

### Section 310.30 Exemptions

- a) General Provisions - The Department may, upon application therefor or upon its own initiative, grant such exemptions or exceptions from the requirements of 32 Ill. Adm. Code: Chapter II, Subchapters b and d 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 is exempt from 32 Ill. Adm. Code: Chapter II, Subchapters b and d 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 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 Department of Energy performing research in, or development, manufacture, storage, testing or transportation of, atomic weapons or components thereof;
  - 3) Prime contractors of the 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 Department of Energy or of the Nuclear Regulatory

Commission when the State and the Nuclear Regulatory Commission jointly determine:

- A) that, under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to the public health and safety; and
- B) that, the exemption of such contractor or subcontractor is otherwise appropriate.

(Source: Amended at 15 Ill. Reg. 10604, effective July 15, 1991)

### Section 310.40 Records

Each licensee and registrant shall maintain records showing the receipt, transfer, use, storage and disposal of all sources of radiation. Additional record requirements are specified elsewhere in 32 Ill. Adm. Code: Chapter II, Subchapters b and d.

(Source: Amended at 15 Ill. Reg. 10604, effective July 15, 1991)

### Section 310.50 Inspections

- a) Each person shall afford the Department at all reasonable times opportunity to inspect radiation installations and sources of radiation and the premises and facilities wherein such radiation installations and sources of radiation are used or stored.
- b) Each person shall make available to the Department for inspection, upon reasonable notice, records maintained pursuant to 32 Ill. Adm. Code: Chapter II, Subchapters b and d.
- c) *The Department is authorized to enter at all reasonable times upon any private or public property for the purpose of determining whether or not there is compliance with or violation of the provisions of this Act and rules and regulations issued thereunder. The Department may inspect and investigate premises, operations, and personnel and have access to and copy records for the purpose of evaluating past, current, and potential hazards to the public health, workers, or the environment resulting from radiation. Entry into areas under the jurisdiction of the Federal Government shall be effected only with the concurrence of the Federal Government or its duly designated representative. [420 ILCS 40/27]*

(Source: Amended at 23 Ill. Reg. 14454, effective January 1, 2000)

**Section 310.60 Tests**

Each licensee and registrant 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) installations 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 or registered sources of radiation.

(Source: Amended at 10 Ill. Reg. 17259, effective September 25, 1986)

**Section 310.70 Additional Requirements**

- a) The Department is authorized to inspect and investigate the premises and operations and personnel of any radiation installation, whether or not such installation is required to be registered or licensed by the Department, for the purpose of studying and evaluating the health hazard(s) caused by the use and operation of such machines and material.
- b) The Department may impose additional requirements upon any licensee or registrant if the Department deems these requirements to be necessary to minimize the danger to public health and safety or the environment.

(Source: Amended at 10 Ill. Reg. 17259, effective September 25, 1986)

**Section 310.74 Cost Assessment**

The Department has authority under the Radiation Protection Act of 1990 [420 ILCS 40] to take actions necessary to abate violations of the Act or any rules or regulations promulgated under the Act and may *provide that all or a portion of the cost of such actions be assessed to operators of radiation installations or other persons responsible for the violation or contamination.* [420 ILCS 40/36]

- a) The Department may assess all or a portion of the costs incurred to abate violations to responsible operators of radiation installations or other responsible persons. Costs that are assessed shall be based on the Department's actual response costs, including, but not limited to:

- 1) Time required by the Department professional staff to coordinate response;
- 2) Time spent traveling and providing administrative support;
- 3) Performance or oversight of decontamination activities at properties contaminated with radioactive material;
- 4) Performance or oversight of confirmatory environmental monitoring;
- 5) Performance or oversight of treatment, storage, transfer and disposal of sources of radiation;
- 6) Equipment and supplies; and
- 7) Contractual support, if any, incurred by the Department.

AGENCY NOTE: These support service costs may include, but are not limited to, rental of specialized equipment, acquisition of additional professional expertise not available within the Department and laboratory fees charged to the Department.

- b) Any party affected by an order of the Department assessing cost shall have the right to a hearing before the Department in accordance with 32 Ill. Adm. Code 200.

(Source: Added at 23 Ill. Reg. 14454, effective January 1, 2000)

**Section 310.75 Emergency Response Cost Recovery**

The Department has authority under the Radiation Protection Act of 1990 [420 ILCS 40] to respond to conditions that constitute an immediate threat to health and to assess the costs of its response against the person or persons responsible for the creation or continuation of the threat.... If the Department is unable to determine who is responsible for the creation or continuation of the threat, the costs shall be assessed against the owner of the property and shall constitute a lien against the property until paid [420 ILCS 40/38(b)].

- a) Costs that are assessed shall be based on:
  - 1) The Department's actual response costs, including, but not limited to:
    - A) Time required by Department professional staff to coordinate response;
    - B) Time spent traveling and providing administrative support;

- C) Performance or oversight of decontamination activities at properties contaminated with radioactive material;
- D) Performance or oversight of confirmatory environmental monitoring;
- E) Performance or oversight of treatment, storage and disposal of sources of radiation;
- F) Equipment and supplies; and
- G) Contractual support, if any, incurred by the Department.

AGENCY NOTE: These support service costs may include, but are not limited to, rental of specialized equipment, acquisition of additional professional expertise not available within the Department and laboratory fees charged to the Department.

- 2) Costs incurred by other units of government while assisting the Department, including agencies of the federal government, provided the costs are submitted as follows:
  - A) Unless otherwise notified by the Department, the request for reimbursement must be received by the Department within 45 days after the assistance is rendered to the Department or 45 days after the costs are determined, whichever is later, but in any case, not later than one year after the assistance is rendered;
  - B) The request shall be in writing and shall include documentation justifying costs to be reimbursed; and
  - C) Reimbursable costs may include, but are not limited to, items specified in subsection (a)(1) of this Section.
- b) All reimbursable costs described in a reimbursement request by a governmental unit are subject to approval by the Director of the Department. The Department may request additional information in support of the requested reimbursement.
- c) If a request by a governmental unit for costs is denied, or denied in part, the Department shall notify the requesting governmental unit of the decision within 30 days after the date the request was submitted.
- d) Each bill for emergency response costs assessed under this Section shall identify the items claimed and the costs related to each. Payment is due to the Department within 45 days after receipt of the bill.

- e) After all emergency response costs have been paid by the responsible parties, the Department shall pay governmental units based on approved requests.
- f) Any person assessed costs under this Section shall have the right to a hearing before the Department provided a written request for a hearing is served on the Department within 10 days after notice of the assessment. In the absence of receipt of a request for a hearing, the affected party shall be deemed to have waived the right to a hearing [420 ILCS 40/38(b)]. Hearings shall be conducted in accordance with 32 Ill. Adm. Code 200.

(Source: Added at 20 Ill. Reg. 15978, effective December 9, 1996)

**Section 310.80 Violations**

- a) *Any person who shall violate any of the provisions of, or who fails to perform any duty imposed by this Act, or who violates any determination or order of the Department promulgated pursuant to the Act, is guilty of a Class A misdemeanor; provided each day during which violation continues shall constitute a separate offense; and in addition thereto, such person may be enjoined from continuing such violation as hereinafter provided. [420 ILCS 40/39(a)]*
- b) *A person who knowingly makes a false material statement to a Department employee during the course of official Department business or in an application for accreditation, certification, registration or licensure under the Act is guilty of a Class A misdemeanor for a first offense and is guilty of a Class 4 felony for a second or subsequent offense. [420 ILCS 40/39(b)(1)]*
- c) *A person who knowingly alters a credential, certificate, registration, or license issued by the Department for the purpose of evading a requirement of the Act is guilty of a Class A misdemeanor for a first offense and is guilty of a Class 4 felony for a second or subsequent offense. [420 ILCS 40/39(b)(2)]*
- d) *Whenever the Department believes upon inspection and examination of a radiation installation or a radiation source as constructed, operated, or maintained that there has been a violation of any of the Department's rules or regulations promulgated pursuant to the Act, the Department, in addition to taking other enforcement action, may impose a civil penalty, not to exceed \$10,000 for such violation, provided each day the violation continues shall constitute a separate offense. [420 ILCS 40/36]*
- e) *The penalties provided herein shall be recoverable in an action brought in the name of the people of the State of Illinois by the Attorney General. [420 ILCS 40/39(c)]*

(Source: Amended at 23 Ill. Reg. 14454, effective January 1, 2000)

**Section 310.81 Policy for Assessment of Civil Penalties**

- a) Civil penalties shall be assessed in accordance with the provisions of this Section and Section 310.82 of this Part.
- b) A civil penalty will be assessed whenever the Department, based on consideration of the factors set forth in subsection (c) of this Section, determines that a civil penalty is appropriate and issues a Preliminary Order and Notice of Opportunity for Hearing, in accordance with 32 Ill. Adm. Code 200.60.
- c) Factors to be Considered in Assessing Civil Penalties
  - 1) The Department shall consider the factors contained in subsection (c)(2) of this Section to determine whether a penalty should be assessed, as provided in subsection (d) of this Section, and the amount of the penalty. However, if the Department has by rule established the amount to be assessed for a particular violation, the Department shall assess the penalty as specified in that rule without regard to the factors contained in subsection (c)(2) of this Section.

AGENCY NOTE: For an example of a rule that establishes the amount of the civil penalty to be assessed, see 32 Ill. Adm. Code 401.170, which specifies the civil penalties to be assessed for violations of the Department's radiologic technologist accreditation requirements.

- 2) The factors to be considered by the Department are:
  - A) History of Previous Violations. The Department shall consider the person's history of previous violations of the Radiation Protection Act of 1990, the Department's rules promulgated under that Act, and licenses issued pursuant to that Act. Each prior violation will be considered without regard to whether it led to a civil penalty assessment. A prior violation shall not be considered, however, if the notice or order relating to the prior violation is the subject of pending administrative or judicial review, or if the time to request such review or to appeal any administrative or judicial decision relating to the prior violation has not expired. The Department shall not consider a prior violation if a Preliminary or Final Order pertaining to that prior violation has been vacated. The Department shall not consider previous violations that occurred more than 6

years prior to the issuance of the Preliminary Order.

- B) Severity of the Violation. The Department shall consider the severity of the violation, including, but not limited to, actual or potential contamination of the environment resulting from the violation and any actual or potential hazard to the health or safety of the public or to workers, resulting from the violation. When evaluating the severity of the violation, the Department may also consider the impact that the violation has on the Department's ability to determine compliance with requirements established by statute, regulation or license condition.
- C) Culpability. The Department shall consider whether the person to whom the Preliminary Order was issued was negligent in causing, allowing, or failing to correct the violation, condition, or practice which was cited in the Preliminary Order. The Department shall also consider:
  - i) whether the violation was intentional or inadvertent;
  - ii) whether the violation was allowed to continue once identified;
  - iii) whether actions were taken to correct or mitigate the violation and the timeliness of such actions; and
  - iv) whether the violation was voluntarily reported to the Department.
- d) Determination of the Amount of Penalty; Assessment of Separate Violations for Each Day
  - 1) The Department may assess a civil penalty not to exceed ten thousand dollars (\$10,000) per violation for each day the violation continues. In determining whether to make such an assessment, the Department shall consider the factors listed in subsection (c) of this Section; however, if the Department's rules specify the amount of the civil penalty to be assessed for a particular violation, the Department shall assess the civil penalty in that amount so specified, without consideration of the factors listed in subsection (c) of this Section.
  - 2) When determining the amount of penalty, the Department shall consider each day of a continuing violation to be a separate violation. Accordingly, the Department may assess a separate penalty, in

**§§310.81-100**

accordance with this Section and Section 310.82 of this Part, for each day that a violation continues.

(Source: Amended at 23 Ill. Reg. 14454, effective January 1, 2000)

**Section 310.82 Procedures for Assessment of Civil Penalties**

a) Issuance of Assessment

- 1) If the Department assesses a civil penalty pursuant to Section 310.81(b) of this Part, it shall do so by issuing a Preliminary Order and Notice of Opportunity for Hearing pursuant to 32 Ill. Adm. Code 200.
- 2) The Preliminary Order and Notice of Opportunity for Hearing shall contain, for each violation alleged, the proposed civil penalty to be assessed.

b) Payment of Assessment

Unless a hearing has been requested by the deadline specified in the Preliminary Order and Notice of Opportunity for Hearing, within 30 days after issuance of the Preliminary Order, the person upon whom the penalty was assessed shall pay the penalty in full.

c) Procedures for Hearing

- 1) The person to whom the Preliminary Order and Notice of Opportunity for Hearing was issued may appeal the imposition of the civil penalty by submitting a written request for a hearing in accordance with 32 Ill. Adm. Code 200.70.
- 2) Upon receiving such a request for a hearing, the Department shall conduct a public hearing regarding the finding of violation or the penalty assessment, in accordance with the provisions of 32 Ill. Adm. Code 200.
- 3) After the hearing is held, the Director shall issue a Final Order in accordance with 32 Ill. Adm. Code 200.230.

d) Final Assessment and Payment of Penalty

- 1) If the person to whom a Preliminary Order and Notice of Opportunity for Hearing is issued fails to request a hearing, the Preliminary Order shall become a final order of the Department and the penalty assessed shall become due and payable within 30 days from issuance of the Preliminary Order.

- 2) If the person to whom a Preliminary Order and Notice of Opportunity for Hearing is issued requests judicial review of a final order of the Department, the penalty assessed in accordance with Section 310.81(c) of this Part shall not be payable until completion of the review.

- 3) The civil penalties provided herein shall be recoverable in an action brought in the name of the people of the State of Illinois by the Attorney General.

(Source: Amended at 23 Ill. Reg. 14454, effective January 1, 2000)

**Section 310.90 Impounding**

- a) Authority of Department in cases constituting an immediate threat to health. *Notwithstanding any other provision of the Act, whenever the Department finds that a condition exists which constitutes an immediate threat to health due to the violation of any provisions of this Act or any code, rule, regulation or order promulgated under this Act and requiring immediate action to protect the public health or welfare, it may issue an order reciting the existence of such an immediate threat and the findings of the Department pertaining thereto. The Department may summarily cause the abatement of such violation or may direct the Attorney General to obtain an injunction against such violator. [420 ILCS 40/38]*
- b) *Such order shall be effective immediately but shall include notice of the time and place of a public hearing before the Department to be held within 30 days of the date of such order to assure the justification of such order. On the basis of such hearing the Department shall continue such order in effect, revoke it or modify it. Any party affected by an order of the Department shall have the right to waive the public hearing proceedings. [420 ILCS 40/38]*

(Source: Amended at 23 Ill. Reg. 14454, effective January 1, 2000)

**Section 310.100 Prohibited Uses**

- a) Hand-held fluoroscopic screens shall not be used with x-ray equipment.
- b) Shoe-fitting fluoroscopic devices shall not be used.

(Source: Amended at 17 Ill. Reg. 18472, effective January 1, 1994)

**Section 310.110 Communications**

All communications and reports concerning these regulations, and applications filed thereunder, should be addressed to the Department at its office, located at 1035 Outer Park Drive, Springfield, Illinois, 62704.

**Section 310.120 Plans and Specifications**

The Director may require the user of any new or altered radiation installation to prepare plans and specifications of the proposed installation and submit them to the Department for review and approval prior to starting construction or operation.

(Source: Added at 10 Ill. Reg. 17259, effective September 25, 1986)

**Section 310.140 Units of Exposure and Radiation Dose**

a) As used in 32 Ill. Adm. Code: Chapter II, Subchapters b and d, the unit of exposure is the coulomb per kilogram (C/kg) or roentgen (R). One roentgen (R) is equal to  $2.58 \times 10^{-4}$  C/kg.

- b) As used in 32 Ill. Adm. Code: Chapter II, Subchapters b and d, the units of radiation dose are:
- 1) "Gray" (Gy) is the SI unit of absorbed dose. One Gy is equal to an absorbed dose of 1 joule per kilogram (J/kg). (1 Gy = 100 rad).
  - 2) "Rad" is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs per gram or 0.01 joule per kilogram (J/kg). (1 rad = 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" (Sv) 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 32 Ill. Adm. Code: Chapter II, Subchapters b and d, the quality factors for converting absorbed dose to dose equivalent are as follows:

**§§310.140**

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 gray equal to 1 Sv or the absorbed dose in rad equal to 1 rem.

d) If it is more convenient to measure the neutron fluence rate than to determine the neutron dose equivalent rate in rem per hour or sievert per hour, as provided in subsection (c) of this Section, 0.01 Sv (1 rem) of neutron radiation of unknown energies may, for purposes of 32 Ill. Adm. Code: Chapter II, Subchapters b and d, 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 convert a measured tissue dose in gray (rad) to dose equivalent in sievert (rem) by using the fluence rate per unit dose equivalent or the appropriate Q value shown below.

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

(a) Value of quality factor (Q) at the point where the dose equivalent is maximum in a 30-centimeter diameter cylinder tissue-equivalent phantom.

(b) Monoenergetic neutrons incident normally on a 30-centimeter diameter cylinder tissue-equivalent phantom.

(Source: Amended at 23 Ill. Reg. 14454, effective January 1, 2000)



### Section 310.150 Units of Activity

For the purposes of 32 Ill. Adm. Code: Chapter II, Subchapters b and d, activity is expressed in the SI unit of becquerel (Bq) or in the special unit of curie (Ci), or their multiples, or disintegrations (transformations) per unit of time (dps, dpm, tps or tpm).

- a) One becquerel (Bq) = 1 disintegration (transformation) per second (dps or tps).
- b) One curie (Ci) =  $3.7 \times 10^{10}$  disintegrations (transformations) per second (dps or tps) =  $3.7 \times 10^{10}$  becquerel (Bq) =  $2.22 \times 10^{12}$  disintegrations (transformations) per minute (dpm or tpm).

(Source: Added at 17 Ill. Reg. 18472, effective January 1, 1994)

## Excerpts from Part 330

### **Section 330.40 License Exemption - Radioactive Materials Other Than Source Material**

#### **a) Exempt Concentrations**

- 1) Any person is exempt from this Part to the extent that such person receives, possesses, uses, transfers, owns or acquires products containing radioactive material introduced in concentrations not in excess of those listed in Section 330. Appendix A of this Part provided they have been distributed pursuant to a license as described in subsection (a)(2) of this Section. This Section shall not be deemed to authorize the import of radioactive materials or products containing radioactive materials.
- 2) No person may introduce radioactive material into a product or material knowing or having reason to believe that it will be transferred to persons exempt under subsection (a)(1) of this Section or equivalent regulations of the U.S. Nuclear Regulatory Commission (10 CFR 30.14), an Agreement State or a Licensing State, except in accordance with a specific license issued pursuant to Section 330.280(a) of this Part or the general license provided in Section 330.900 of this Part.

#### **b) Exempt Quantities**

- 1) Any person is exempt from this Part to the extent that such person receives, possesses, uses, transfers, owns or acquires radioactive material in individual quantities each of which does not exceed the applicable quantity set forth in Section 330. Appendix B of this Part provided they have been distributed pursuant to a license as described in subsection (b)(3) of this Section.

AGENCY NOTE: Capsules distributed pursuant to 10 CFR 32.21 that contain carbon-14 urea are only authorized for "in-vivo" diagnostic use for humans. Any person who desires to use the capsules for research involving human subjects shall apply for and receive a specific license from the Department. Nothing in this Section relieves persons from complying with applicable Federal and State requirements governing receipt, administration and use of drugs.

- 2) This subsection (b) does not authorize the production, packaging or repackaging of radioactive material for purposes of commercial distribution, or the incorporation of radioactive

material into products intended for commercial distribution.

- 3) No person may, for purposes of commercial distribution, transfer radioactive material in the individual quantities set forth in Section 330. Appendix B of this Part, knowing or having reason to believe that such quantities of radioactive material will be transferred to persons exempt under this subsection (b) or equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State, except in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.18 or 32.21, or by the Department pursuant to Section 330.280(b) of this Part, which states that the radioactive material may be transferred by the licensee to persons exempt under this subsection (b) or the equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State.

AGENCY NOTE: Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing byproduct material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

#### **c) Exempt Items**

- 1) Certain Items Containing Radioactive Material. Except for persons who apply radioactive material to, or persons who incorporate radioactive material into the following products or persons who initially transfer for sale or distribution the following products, any person is exempt from this Part to the extent that he receives, possesses, uses, transfers, owns or acquires the following products:

AGENCY NOTE: Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing byproduct material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

- A) Timepieces or hands or dials containing not more than the following specified quantities of radioactive material and not exceeding the following specified radiation dose rate:
- i) 925 MBq (25 mCi) of tritium per timepiece;
  - ii) 185 MBq (5 mCi) of tritium per hand;
  - iii) 555 MBq (15 mCi) of tritium per dial (bezels when used shall be considered as part of the dial);
  - iv) 3.7 MBq (100 microCi) of promethium-147 per watch or 7.4 MBq (200 microCi) of promethium-147 per any other timepiece;
  - v) 740 kBq (20 microCi) of promethium-147 per watch hand or 1.48 MBq (40 microCi) of promethium-147 per other timepiece hand;
  - vi) 2.22 MBq (60 microCi) of promethium-147 per watch dial or 4.44 MBq (120 microCi) of promethium-147 per other timepiece dial (bezels when used shall be considered as part of the dial);
  - vii) The radiation dose rate from hands and dials containing promethium-147 will not exceed, when measured through 50 milligrams per square centimeter of absorber: for wrist watches, 1 uGy (100 microrad) per hour at 10 centimeters from any surface; for pocket watches, 1 uGy (100 microrad) per hour at 1 centimeter from any surface; for any other timepiece, 2 uGy (200 microrad) per hour at 10 centimeters from any surface; or
  - viii) 37 kBq (1 microCi) of radium-226 per timepiece in timepieces acquired prior to May 1, 1974.
- B) Lock illuminators containing not more than 555 MBq (15 mCi) of tritium or not more than 74 MBq (2 mCi) of promethium-147 installed in automobile locks. The radiation dose rate from each lock illuminator containing promethium-147 will not exceed 10 uGy (1 mrad) per hour at 1 centimeter from any surface when measured through
- 50 milligrams per square centimeter of absorber.
- C) Precision balances containing not more than 37 MBq (1 mCi) of tritium per balance or not more than 18.5 MBq (500 microCi) of tritium per balance part.
- D) Automobile shift quadrants containing not more than 925 MBq (25 mCi) of tritium.
- E) Marine compasses containing not more than 27.8 GBq (750 mCi) of tritium gas and other marine navigational instruments containing not more than 9.25 GBq (250 mCi) of tritium gas.
- F) Thermostat dials and pointers containing not more than 925 MBq (25 mCi) of tritium per thermostat.
- G) Electron tubes; provided that each tube does not contain more than one of the following specified quantities of radioactive material:
- i) 5.55 GBq (150 mCi) of tritium per microwave receiver protector tube or 370 MBq (10 mCi) of tritium per any other electron tube;
  - ii) 37 kBq (1 microCi) of cobalt-60;
  - iii) 185 kBq (5 microCi) of nickel-63;
  - iv) 1.11 MBq (30 microCi) of krypton-85;
  - v) 185 kBq (5 microCi) of cesium-137; or
  - vi) 1.11 MBq (30 microCi) of promethium-147;
- and provided further, that the radiation dose rate from each electron tube containing radioactive material will not exceed 10 uGy (1 mrad) per hour at 1 centimeter from any surface when measured through 7 milligrams per square centimeter of absorber.
- AGENCY NOTE: For purposes of subsection (c)(1)(G) of this Section, "electron tubes" include spark gap tubes, power tubes, gas tubes including glow lamps, receiving tubes, microwave tubes, indicator tubes, pick-up tubes, radiation detection tubes and any other completely sealed tube that is designed to conduct or control electrical currents.

H) Ionizing radiation measuring instruments containing, for purposes of internal calibration or standardization, one or more sources of radioactive material, provided that:

- i) Each source contains no more than one exempt quantity set forth in Section 330. Appendix B of this Part; and
- ii) Each instrument contains no more than ten exempt quantities. For purposes of this requirement, an instrument's source(s) may contain one or more radionuclides and an individual exempt quantity may be composed of fractional parts of one or more of the exempt quantities in Section 330. Appendix B of this Part, provided that the sum of such fractions shall not exceed unity.

AGENCY NOTE: For purposes of subsection (c)(1)(H) of this Section, 1.85 kBq (50 nCi) of americium-241 is considered an exempt quantity.

D) Spark gap irradiators containing not more than 37 kBq (1 microCi) of cobalt-60 per spark gap irradiator for use in electrically-ignited fuel oil burners having a firing rate of at least 11.4 liters (3 gallons) per hour.

2) Self-Luminous Products Containing Radioactive Material

A) Tritium, Krypton-85 or Promethium-147. Except for persons who manufacture, process or produce self-luminous products containing tritium, krypton-85 or promethium-147, any person is exempt from this Part to the extent that such person receives, possesses, uses, transfers, owns or acquires tritium, krypton-85 or promethium-147 in self-luminous products manufactured, processed, produced, imported or transferred in accordance with a specific license, issued by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.22, which authorizes the transfer of the product to persons who are exempt from regulatory requirements. The exemption in this subsection does not apply to tritium, krypton-85 or promethium-147 used in products for frivolous purposes or in toys or adornments. The U.S. Nuclear Regulatory Commission shall make this determination of exemption.

B) Radium-226. Any person is exempt from this Part to the extent that such person receives, possesses, uses, transfers or owns articles containing less than 3.7 kBq (100 nCi) of radium-226 which were acquired prior to May 1, 1974.

3) Gas and Aerosol Detectors Containing Radioactive Material

A) Except for persons who manufacture, process, produce or initially transfer for sale and distribution gas and aerosol detectors containing radioactive material, any person is exempt from 32 Ill. Adm. Code: Chapter II, Subchapters b and d to the extent that such person receives, possesses, uses, transfers, owns or acquires radioactive material in gas and aerosol detectors designed to protect life or property from fires and airborne hazards provided that detectors containing radioactive material shall have been manufactured, imported or initially transferred in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.26 or a Licensing State pursuant to Section 330.280(c) of this Part, which authorizes the transfer of the detectors to persons who are exempt from regulatory requirements.

AGENCY NOTE: Authority to transfer possession or control by the manufacturer, processor or producer of any equipment, device, commodity or other product containing byproduct material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

B) Gas and aerosol detectors previously manufactured and distributed to general licensees in accordance with a specific license issued by an Agreement State shall be considered exempt under subsection (c)(3)(A) of this Section, provided that the device is labeled in accordance with the specific license authorizing distribution of the generally licensed device and provided further that they meet the requirements of Section 330.280(c) of this Part.

- C) Gas and aerosol detectors containing naturally- occurring or accelerator-produced radioactive material (NARM) previously manufactured and distributed in accordance with a specific license issued by a Licensing State shall be considered exempt under subsection (c)(3)(A) of this Section, provided that the device is labeled in accordance with the specific license authorizing distribution and provided further that they meet the requirements of Section 330.280(c) of this Part.
- 4) Resins Containing Scandium-46 and Designed for Sand Consolidation in Oil Wells. Any person is exempt from this Part to the extent that such person receives, possesses, uses, transfers, owns or acquires synthetic plastic resins containing scandium-46 which are designed for sand consolidation in oil wells. Such resins shall have been manufactured or imported in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission, or shall have been manufactured in accordance with the specifications contained in a specific license issued by the Department or an Agreement State to the manufacturer of such resins pursuant to licensing requirements equivalent to those in 10 CFR 32.17 published January 1, 1997, exclusive of subsequent amendments or editions. This exemption does not authorize the manufacture of any resins containing scandium-46.

(Source: Amended at 22 Ill. Reg. 14459, effective July 27, 1998).