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6 NYCRR PART 380: Rules and Regulations
for the Prevention and Control of Environmental
Pollution by Radioactive Materials

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New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials

Amendments to 6 NYCRR Part 380:
Rules and Regulations for Prevention and Control of Environmental Pollution
by Radioactive Materials

Existing sections 380-1.1 through 380-1.3 are amended to read as follows:

SUBPART 380-1 GENERAL PROVISIONS

Section 380-1.1 Purpose.

(a) The regulations in this Part establish standards for protection against ionizing radiation resulting from the disposal and [discharge] release of radioactive material to the environment. These regulations are issued under Articles 1, 3, 17, 19, 27, [and] 29, and 37 of the Environmental Conservation Law.

(b) It is the purpose of the regulations in this Part to control the disposal and [discharge] release of radioactive material to the environment in such a manner that the total dose to an individual member of the public (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 Subpart 380-5 of this Part. However, nothing in this Part [shall be construed as limiting] limits actions that may be necessary to protect public health and safety or the environment.

(c) This Part also gives notice to all persons who knowingly provide the following to any permittee, applicant, contractor, or subcontractor: components, equipment, materials, or other goods or services that relate to a permittee's or an applicant's activities subject to this Part. Such persons may be individually subject to enforcement action for violation of section 380-10.8 of this Part.

Section 380-1.2 Applicability.

(a) Except as otherwise specifically provided, this Part applies to any person who disposes of or [discharges] releases licensed material within the State, or whose loss of control of licensed material within the State results or may result in the disposal or [discharge] release of such material [within the State] to the environment.

(b) This Part applies to [the disposal] any person who disposes of radioactive tailings or wastes produced by the extraction or concentration of uranium or thorium for any ore

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processed primarily for its source material content, where such tailings or wastes are not regulated by the US Nuclear Regulatory Commission.

(c) This Part applies to any person who disposes of or releases unlicensed and concentrated or processed naturally occurring radioactive material, if the Department determines that the discharge or disposal of the material has the potential to:

(i) impair the best use of the waters of the state as defined in Parts 700 through 706 of this Title; or

(ii) result in doses in excess of the ALARA constraints for air emission standards established in subdivision 380-5.1(b) of this Part; or

(iii) result in radiation doses in excess of 25 percent of the limits in Subpart 380-5 of this Part, due to the presence of the radioactive materials in soil.

(d) By an order issued under any Department authority, this Part, or any provisions of this Part, may be made applicable to any person who maintains a site containing buried radioactive waste, and pursuant thereto the Department may apply lower dose limits as specified in such an order.

[(c)]e) This Part does not apply to the protection of radiation workers, and the limits in this Part do not apply to doses due to background radiation, to exposure of patients to radiation for the purpose of medical diagnosis or therapy, or to voluntary participation in medical research programs.

[(d)]f) This Part does not apply to persons who dispose or release radioactive material in forms and quantities that are specifically exempted from [or not subject to] general or specific licensing and regulatory control pursuant to regulations of the [New York State Department of Labor,] New York State Department of Health, New York City Department of Health, U.S. Nuclear Regulatory Commission, or licensing agency of an agreement state.

[(e) This Part does not apply to NORM or materials containing NORM unless processed and concentrated.]

(g) This Part does not apply to persons who dispose of or release the following radioactive materials:

(1) intact smoke detectors containing Am-241 sources manufactured and distributed in accordance with a radioactive materials license;

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(2) household solid waste containing excreted residues of radiopharmaceuticals that were administered to an individual in accordance with a radioactive materials license;

(3) naturally occurring radioactive material with atomic numbers less than 92, in any form and in natural isotopic abundance; or

(4) naturally occurring radioactive material in its place of deposit by nature, and undisturbed by human intervention.

[[f]h] This Part does not apply to any person who disposes of or releases radioactive materials to the extent that such [person] disposal or release is subject to regulation by the U.S. Nuclear Regulatory Commission or the U.S. Department of Energy.

[[g]i] This Part does not apply to the following categories of U.S. Department of Energy or U.S. Nuclear Regulatory Commission contractor or subcontractor to the extent that such contractor or subcontractor receives, possesses, uses, transfers, or acquires sources of radiation under contract:

(1) prime contractors performing work for the U.S. Department of Energy at U.S. Government-owned or -controlled sites, including transportation of sources of radiation to or from such sites and the performance of contract services during temporary interruptions of such transportation;

(2) prime contractors of the U.S. Department of Energy performing research in, or development, manufacture, storage, testing, or transportation of, atomic weapons or components thereof;

(3) prime contractors of the U.S. Department of Energy using or operating nuclear reactors or other nuclear devices in a United States Government-owned vehicle or vessel; and

(4) any other prime contractor or subcontractor of the U.S. Department of Energy or of the U.S. Nuclear Regulatory Commission when the State and the U.S. Nuclear Regulatory Commission jointly determine:

(i) that the exemption of the prime contractor or subcontractor is authorized by law; and

(ii) that, under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to public health and safety or the environment.

Section 380-1.3 Communications.

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(a) Written Reports. Unless otherwise specified, written communications or reports [concerning] required by [the regulations in] this Part [should] must be addressed to the New York State Department of Environmental Conservation, Radiation Control Permit Section, Bureau of Hazardous Waste and Radiation Management, Division of Solid and Hazardous Materials [Substances Regulation], 625 Broadway, Albany, New York 12233-7255.

(b) Telephoned Reports. All persons who make telephone reports under this Part must contact the Bureau of Hazardous Waste and Radiation Management at (518-402-8579) during business hours, and to the Department's Spill Hotline (1-800-457-7362) at all other times.

(Existing section 380-1.4 through paragraph 380-1.5(a)(2) remains unchanged.)

Section 380-1.4 Severability.

If any provision in this Part or its application or circumstances is held invalid, the remainder of this Part and the application of those provisions to persons or circumstances, other than those to which it is held invalid, will not be affected thereby.

Section 380-1.5 Transition.

The following constitute the transition rules for this Part.

(a) Existing permits.

(1) This section applies to permittees having a permit in effect on the day before the effective date of this Part.

(2) Each permit is hereby continued until the expiration date of the permit. The permittee must comply with the conditions of the permit, except as they may be modified by the Department pursuant to Part 621 of this Title, until the permit expires, is terminated, or is modified pursuant to Part 621 of this Title.

Subdivision 380-1.5(a)(3) through section 380-1.6 are amended to read as follows:

(3) The permittee must comply with all provisions of this Part beginning on the effective date of this Part[, except for the provisions in Subpart 380-7 of this Part. The permittee must comply with Subpart 380-7 of this Part beginning on the effective date of the permit renewal, modification of the permit at the permittee's request, or modification of the permit by the Department pursuant to section 621.13 of this Title to require compliance with Subpart 380-7 of this Part. Permittees may elect to comply with Subpart 380-7 in advance of those dates by requesting a modification of their permit.]

(b) Existing facilities currently in violation.

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A facility constructed or operated in violation of the regulations in effect on the day before the effective date of this Part is subject to the requirements of this Part as of its effective date. Each enforcement action pending on the day before the effective date of this Part is hereby continued, and the standards for compliance [shall be] are those contained in this Part.

(c) Existing facilities currently not in violation.

This subdivision pertains to existing facilities which first became subject to the permit requirements of section 380-3.1 of this Part due to amendment of this Part. No later than six months after the effective date of this Part, the owner or operator of such a facility existing on said effective date, and for which a permit was not required on the day before the effective date, must submit to the Department a complete permit application pursuant to section 380-3.2 of this Part. Upon timely receipt of a complete application, the facility will be temporarily authorized to continue in operation for a period, commencing on said effective date, and ending on the date of the Department's final decision on the application.

Existing section 380-1.6 is repealed.

[Section 380-1.6 Documents incorporated by reference.

(a) Documents.

The following documents, referenced in this Part, are available for review and at the Department's offices at 625 Broadway, Albany, New York 12233:

- (1) Section 274 of the Atomic Energy Act of 1954 (42 U.S.C. 2021), 1982.
- (2) Title 10 Code of Federal Regulations (CFR) Part 20, dated June 1991.
- (3) Title 40 Code of Federal Regulations (CFR) Part 190, dated July, 1990.
- (4) New York City Health Code Article 175 - Radiation Control, 1986.

(b) Availability of documents.

(1) Documents (1), (2), and (3) can be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(2) Document (4) can be obtained from the New York City Department of Health, Bureau for Radiation Control, 111 Livingston Street, 20th Floor, Brooklyn, New York, 11201.]

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SUBPART 380-2 DEFINITIONS

Section 380-2.1 General Definitions

Subdivision 380-2.1(a) introductory text is amended to read as follows:

(a) [For the purposes of this Part, the] The following terms [shall] have the following meanings when used in this Part.

(Existing paragraphs 380-2.1(a)(1) through (3) remain unchanged.)

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

(2) "Activity" is the rate of disintegration (transformation) or decay of radioactive material. The units of activity are the curie (Ci) and the becquerel (Bq).

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

Paragraph 380-2.1(a)(4) and (5) are amended to read as follows:

(4) "Agreement state" means any state that has entered into an affective agreement with the U.S. Nuclear Regulatory Commission [pursuant to Section 274b. of the Atomic Energy Act of 1954, as amended (see section 380-1.6 of this Part)].

(5) "ALARA" (as low as reasonably achievable) means making every reasonable effort to maintain exposures to radiation as far below the dose limits in this Part as is practical consistent with the purpose for which the [licensed activity] action 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 [licensed] radioactive materials in the public interest.

(Existing paragraphs 380-2.1(a)(6) through (12) remain unchanged.)

(6) "Annual limit on intake" (ALI) means the derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man that would result in a committed effective dose equivalent of 5 rems (0.05 Sv) or a committed dose equivalent of 50 rems (0.5 Sv) to any individual organ or tissue. (ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table I, Columns 1 and 2, of Subpart 380-11 of this Part).

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(7) "Applicant" means the person applying for a permit issued pursuant to this Part.

(8) "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 anthropogenic sources. "Background radiation" does not include radiation from licensed radioactive material.

(9) "Biological material" means material derived from living organisms.

(10) "Class" (or lung class or inhalation class) means a classification scheme for inhaled material according to its rate of clearance from the pulmonary region of the lung. Materials are classified as D, W, or Y, which applies to a range of clearance half-times: for Class D (Days) of less than 10 days, for Class W (Weeks) from 10 to 100 days, and for Class Y (Years) of greater than 100 days.

(11) "CFR" means the Code of Federal Regulations.

(12) "Collective dose" is 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.

Paragraph 380-2.1(a)(13) is repealed. Existing paragraphs 380-2.1(a)(14) and (15) are renumbered 380-2.1(13) and (14) .

[(13) "Commissioner" means the Commissioner of the New York State Department of Environmental Conservation.]

[[14]13) "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.

[[15]14) "Committed effective dose equivalent" ($H_{E,50}$) is the sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues ($H_{E,50} = \sum w_T H_{T,50}$).

New paragraph 380-2.1(a)(15) is adopted to read as follows:

(15) "Constraint" or "dose constraint" means a value above which specified permittee actions are required.

(Existing paragraphs 380-2.1(a)(16) through (19) remain unchanged.)

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(16) "Deep-dose equivalent" (H_d), which applies to external whole-body exposure, is the dose equivalent at a tissue depth of 1 cm (1000 mg/cm²).

(17) "Department" means the New York State Department of Environmental Conservation.

(18) "Derived air concentration" (DAC) means the concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2,000 hours under conditions of light work (inhalation rate 1.2 cubic meters of air per hour), results in an intake of one ALI. DAC values are given in Table I, Column 3, in Subpart 380-11 of this Part.

(19) "Derived air concentration-hour" (DAC-hour) is the product of the concentration of radioactive material in air (expressed as a fraction or multiple of the derived air concentration for each radionuclide) and the time of exposure to that radionuclide, in hours. A licensee may take 2,000 DAC-hours to represent one ALI, equivalent to a committed effective dose equivalent of 5 rems (0.05 Sv).

Existing paragraph 380-2.1(a)(20) is amended to read as follows:

(20) "Discharge" means [the controlled] a release of [licensed] material in effluents to the [air,] ground or surface water [or sanitary sewer from radiation installations] of the State.

New paragraph 380-2.1(a)(21) is adopted to read as follows:

(21) "Disposal" is the act of discarding material. Depositing or injecting radioactive material is disposal unless the radioactive material is being used in a scientific or other study, as authorized by a permit issued under section 380-3.1 of this Part.

Existing paragraphs 380-2.1(a)(21) through (23) are renumbered 380-2.1(22) through (24).

([21]22) "Dose" (or radiation dose) is a generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent, as defined in Section 380-2.3 of this Part.

([22]23) "Dose equivalent" (H_T) means the product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units of dose equivalent are the rem and sievert (Sv). Rem is the special unit and sievert is the SI unit used for any of the quantities expressed as dose equivalent.

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([23]24) "Effective dose equivalent" (H_E) is the sum of the products of the dose equivalent to the organ or issue (H_T) and the weighting factors (w_T) applicable to each of the body organs or tissues that are irradiated $H_E = \sum w_T H_T$.

New paragraphs 380-2.1(a)(25) through (27) are adopted to read as follows:

(25) "Effluent" means material released to the air or water.

(26) "Effluent treatment" means those processes designed to reduce the concentration of radionuclides in effluents to air or water that employ equipment permanently installed in the effluent ducts or pipes. It does not include devices or procedures employed before the effluent enters the duct or pipes to reduce the concentration of radionuclide in the air or water entering the duct or pipe.

(27) "Emission" means a release of material to the outdoor atmosphere.

Existing paragraphs 380-2.1(a)(24) through (27) are renumbered 380-2.1(a)(28) through (31).

([24]28) "Environmental Conservation Law" (or ECL) means Chapter 43-B of the Consolidated Laws of New York.

([25]29) "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. The SI unit of exposure is the coulomb per kilogram (C/kg) (see section 380-2.2 of this Part).

([26]30) "External dose" means that portion of the dose equivalent received from radiation sources outside the body.

([27]31) "Extremities" means hand, elbow, arm below the elbow, foot, knee, and leg below the knee.

Existing paragraphs 380-2.1(a)(28) through (30) are repealed.

(28) "Eye dose equivalent" applies to the external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm²).

(29) "Generally applicable environmental radiation standards" means standards issued by the U.S. Environmental Protection Agency (EPA) under the authority of the Atomic Energy Act of 1954, as amended, that impose limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment outside the

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boundaries of locations under the control of persons possessing or using radioactive material (see section 380-1.6 of this Part).

(30) "Government agency" means any office, department, board, commission, bureau, division, council, authority, corporation, agency, or instrumentality of the State of New York.]

Existing paragraph 380-2.1(a)(31) is renumbered 380-2.1(a)(32).

([31]32) "Gray" (see section 380-2.3 of this Part).

Existing paragraph 380-2.1(a)(32) is repealed.

[(32) "Incinerator" means an enclosed device using controlled flame combustion to thermally break down radioactive waste to an ash residue that contains little or no combustible material.]

New paragraph 380-2.1(a) (33) is adopted to read as follows:

(33) "Incineration" means thermally breaking down waste in an enclosed device using controlled flame combustion, to an ash residue that contains little or no combustible material as a method of disposal.

Existing paragraphs 380-2.1(a)(33) through (35) are renumbered 380-2.1(a)(34) through (36).

([33]34) "Individual" means any human being.

([34]35) "Inspection" means an official examination or observation including, but not limited to, records, tests, surveys, and monitoring to determine compliance with rules, regulations, orders, requirements, and conditions of the Department.

([35]36) "Internal dose" means that portion of the dose equivalent received from radioactive material taken into the body.

New paragraph 380-2.1(a)(37) is adopted to read as follows:

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

Existing paragraph 380-2.1(a)(36) is renumbered 380-2.1(a)(38) and amended to read as follows:

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(([36]38) "License" means a radioactive material license issued by the [New York State Department of Labor,] New York State Department of Health, New York City Department of Health, U.S. Nuclear Regulatory Commission, or licensing agency of an agreement state, authorizing the receipt, possession, use, transfer, or disposal of radioactive material.

Existing paragraphs 380-2.1(a)(37) and (38) are renumbered 380-2.1(a)(39) and (40).

(([37]39) "Licensee" means the holder of a license.

(([38]40) "Licensing agency" means the city, state, or federal government agency authorized to issue radioactive material licenses.

Existing paragraph 380-2.1(a)(39) is renumbered 380-2.1(a)(41) and amended to read as follows:

(([39]41) "Licensed material" means radioactive material subject to general or specific licensing and regulatory control by the [New York State Department of Labor,] New York State Department of Health, New York City Department of Health, U.S. Nuclear Regulatory Commission, or licensing agency of an agreement state.

Existing paragraph 380-2.1(a)(40) is renumbered 380-2.1(a)(42).

(([40]42) "Limits" (dose limits) means the permissible upper bounds of radiation doses.

Existing paragraph 380-2.1(a)(41) is renumbered 380-2.1(a)(43) and amended to read as follows:

(([41]43) "Loss of control of [licensed] radioactive material" means the [unintentional] loss of containment of radioactive material or radioactive material whose location is unknown which may result in the unauthorized disposal or [discharge] release of radioactive material to the environment.

Existing paragraph 380-2.1(a)(42) is renumbered 380-2.1(a)(44) and amended to read as follows:

(([42]44) "Member of the public" means [an] any individual [in a controlled or unrestricted area. However, an individual is not a member of the public during any period in which the individual receives] except when that individual is receiving an occupational dose.

Existing paragraphs 380-2.1(a)(43) and (44) are renumbered 380-2.1(a)(45) and (46).

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[[43]45] "Monitoring" (radiation monitoring, radiation protection monitoring) means the measurement of radiation levels, 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.

[[44]46] "Nonstochastic effect" (deterministic effect) means a health effect, the severity of which varies with the dose and for which a threshold is believed to exist. Radiation-induced cataract formation is an example of a nonstochastic effect.

Existing paragraph 380-1.2(a)(45) is repealed.

[(45) "NORM" means any naturally occurring radioactive material.]

Existing paragraph 380-1.2(a)(46) is renumbered 380-2.1(a)(47).

[[46]47] "NYCRR" means the Codes, Rules and Regulations of the State of New York.

Existing paragraph 380-2.1(a)(47) is renumbered 380-2.1(a)(48) and amended to read as follows:

[[47]48] "Occupational dose" means the dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation and/or to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include dose received from background radiation, as a patient from medical practices, from voluntary participation in medical research programs, or as a member of the general public.

Existing paragraph 380-2.1(a)(48) is repealed.

[(48) "Person" means--

(i) Any individual; public, private, or government corporation; joint stock company; industry; partnership; co-partnership; firm; association; trust; estate; public or private institution; agency, department, or bureau of the State, or group, political subdivision of the State, any other State or political subdivision thereof; federal government agencies other than the U.S. Nuclear Regulatory Commission or Department of Energy; any foreign government or nation or any political subdivision of any such government or nation; and

(ii) Any legal subsidiary, successor, representative, agent, or agency of the foregoing, or any other legal entity whatsoever.]

Existing paragraph 380-2.1(a)(49) and (50) are amended to read as follows:

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(49) "Permit" means a radiation control permit issued pursuant to this Part authorizing the disposal or [discharge] release of radioactive material to the environment [issued pursuant to this Part and the terms and conditions of that permit], the use of radioactive materials in the environment, or the maintenance of a former land burial site. The permit includes any conditions or variances. It identifies the approved action and contains standards and conditions of performance for the action.

(50) "Permittee" means [the radiation installation or person who has been issued] a person authorized to undertake an action regulated under a permit pursuant to this Part. Eligible permittees are owners, lessees, and operators at a site or facility.

New paragraphs 380-2.1(a)(51) and (52) are adopted to read as follows:

(51) "Person" means any corporation, limited liability corporation, limited liability partnership, firm, partnership, association, trust, estate, one or more individuals, any other legal entity or an unit of state of local government or any agency or subdivision thereof, including any State department, bureau, commission, board or other agency, public authority or public benefit corporation.

(52) "Public dose" means the dose received by a member of the public from exposure to radiation and/or radioactive material released into the environment by a party regulated under this Part, or to any other source of radiation under the control of a party regulated under this Part. It does not include occupational dose or doses received from background radiation, as a patient from medical practices, or from voluntary participation in medical research programs.

Existing paragraphs 380-2.1(a)(51) through (53) are renumbered 380-2.1(a)(53) through (55).

([51]53) "Quality Factor" (Q) means the modifying factor (listed in Tables 1 and 2 of section 380-2.3 of this Part) that is used to derive dose equivalent from absorbed dose.

([52]54) "Rad" (see section 380-2.3 of this Part).

([53]55) "Radiation" (ionizing radiation) means alpha particles, beta particles, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other particles capable of producing ions. Radiation, as used in this part, does not include non-ionizing radiation, such as radiowaves or microwaves, or visible, infrared, or ultraviolet light.

Existing paragraph 380-1.2(a)(54) is repealed.

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

[(54) "Radiation Safety Officer" means an individual who has the knowledge of and responsibility to apply appropriate radiation protection regulations, standards, and practices, and who is specifically authorized on a license.]

Existing paragraphs 380-1.2(a)(55) through (57) are renumbered 380-2.1(a)(56) through (58).

[[55]56] "Radioactive material" means any material (solid, liquid, or gas) which emits radiation spontaneously.

[[56]57] "Radioactivity" means the transformation of unstable atomic nuclei by the emission of radiation.

[[57]58] "Reference man" means a hypothetical aggregation of human physical and physiological characteristics determined by international consensus. These characteristics may be used by researchers and public health workers to standardize results of experiments and to relate biological insult to a common base.

New paragraph 380-2.1(a)(59) is adopted to read as follows:

(59) "Release" is any release of material to the environment.

Existing paragraphs 380-1.2(a)(58) and (59) are renumbered 380-1.2(a)(60) and (61).

[[58]60] "Rem" (see section 380-2.3 of this Part).

[[59]61] "Restricted area" means an area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area.

Existing paragraphs 380-2.1(a)(60) and (61) are renumbered 380-2.1(a)(62) and (63) and are amended to read as follows:

[[60]62] "Sanitary sewerage" means a system of public sewers for carrying off waste water and refuse, but excluding [sewage] on-site waste water treatment facilities, septic tanks, and leach fields owned or operated by the [radiation installation] discharger.

[[61]63] "Shallow-dose equivalent" (H_s), which applies to the external exposure of the skin of the whole body or the skin of an extremity, is taken as the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm^2) [averaged over an area of 1 square centimeter].

Existing paragraphs 380-2.1(a)(62) through (66) are renumbered 380-2.1(a)(64) through (68).

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

([62]64) "SI" is the abbreviation for the International System of Units.

([63]65) "Sievert" (see section 380-2.3 of this Part).

([64]66) "Stochastic effect" (probabilistic effect) means a health effect that occurs randomly and for which the probability of the effect occurring, rather than its severity, is assumed to be a function of dose without threshold. Hereditary effects and cancer incidence are examples of stochastic effects.

([65]67) "Survey" means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation. When appropriate, such an evaluation includes a physical survey of the location of radioactive material and measurements or calculations of levels of radiation, or concentrations or quantities of radioactive material present.

([66]68) "Total Effective Dose Equivalent" (TEDE) means the sum of the [deep-] effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

New paragraph 380-2.1(a)(69) is adopted to read as follows:

(69) "Uncontrolled release" means a release of radioactive material to the environment that was unplanned, due to failure to secure radioactive material, equipment failure, human error, or a severe event such as fire, flood, or storm.

Existing paragraph 380-2.1(a)(67) is renumbered 380-2.1(a)(70).

([67]70) "Unrestricted area" means an area, access to which is neither limited nor controlled by the licensee.

Existing paragraph 380-2.1(a)(68) is renumbered 380-2.1(a)(71) and amended to read as follows:

([68]71) "Week" means 7 consecutive days [starting on Sunday].

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

Existing paragraphs 380-2.1(a)(69) through (71) are renumbered 380-2.1(a)(72) through (74).

([69]72) "Weighting factor, w_T ," for an organ or tissue (T) is the proportion of the risk of stochastic effects resulting from irradiation of that organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly. For calculating the effective dose equivalent, the values of w_T are:

ORGAN DOSE WEIGHTING FACTORS	
Organ or Tissue	w_T
Gonads	0.25
Breast	0.15
Red bone marrow	0.12
Lung	0.12
Thyroid	0.03
Bone surfaces	0.03
Remainder	0.30 ^a
Whole Body	1.00 ^b

^a 0.30 results from 0.06 for each of 5 "remainder" organs (excluding the skin and the lens of the eye) that receive the highest doses.

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

([70]73) "Whole body" means, for purposes of external exposure, head, trunk (including male gonads), arms above the elbow, or legs above the knee.

([71]74) "Year" means the period of time beginning in January used to determine compliance with the provisions of this Part. The permittee may change the starting date of the year used to determine compliance by the permit provided that the change is made at the beginning of the year and that no day is omitted or duplicated in consecutive years.

(Section 380-2.2 through subdivision 380-2.3 (b) remain unchanged.)

Section 380-2.2 Units of Radioactivity

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

For the purposes of this Part, activity is expressed in the special unit of curies (Ci) or in the SI unit of becquerels (Bq), or their multiples, or disintegrations (transformations) per unit of time.

- (a) One becquerel = 1 disintegration per second (s^{-1}).
- (b) One curie = 3.7×10^{10} disintegrations per second
= 3.7×10^{10} becquerels
= 2.22×10^{12} disintegrations per minute.

Section 380-2.3 Units of radiation dose.

(a) Definitions. As used in this Part, the units of radiation doses are:

(1) "Gray" (Gy) is the SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 Joule/kilogram (100 rads).

(2) "Rad" is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs/gram or 0.01 joule/kilogram (0.01 gray).

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

(4) "Sievert" is the SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sieverts is equal to the absorbed dose in grays multiplied by the quality factor (1 Sv = 100 rems).

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

(b) As used in this Part, the quality factors for converting absorbed dose to dose equivalent are shown in Table 1 below.

TABLE 1		
QUALITY FACTORS AND ABSORBED DOSE EQUIVALENCIES		
TYPE OF RADIATION	Quality Factor (Q)	Absorbed Dose Equal to a Unit Dose Equivalent ^a
X-, gamma, or beta radiation	1	1
Alpha particles, multiple-charged particles, fission fragments and heavy particles of unknown charge	20	0.05
Neutrons of unknown energy	10	0.1
High-energy protons	10	0.1

^a Absorbed dose in rad equal to 1 rem or the absorbed dose in gray equal to 1 sievert.

Existing subdivision 380-2.3(c) is amended to read as follows:

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

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

TABLE 2
MEAN QUALITY FACTORS, Q, AND FLUENCE PER UNIT DOSE
EQUIVALENT FOR MONOENERGETIC NEUTRONS

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

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

^b Monoenergetic neutrons incident normally on a 30-cm diameter cylinder tissue-equivalent phantom.

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

The title of Subpart 380-3 is amended to read as follows:

SUBPART 380-3 PERMITS [FOR DISCHARGE AND DISPOSAL OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT]

Existing sections 380-3.1 through 380-3.2 are repealed. New sections 380-3.1 through 380-3.3 are adopted to read as follows:

[Section 380-3.1 Permit application requirements.

Except as otherwise specifically provided in this Part, any person who discharges licensed material into the air or water or disposes of radioactive material subject to this Part to the environment must obtain a permit issued pursuant to this Part. Such permits apply to the radioactive material contained in the discharge or the material to be disposed of.]

Section 380-3.1 Permit requirements

(a) Except as provided in sections 380-3.5 of this Part, persons subject to this Part must obtain a permit before:

- (i) engaging in the emission of radioactive material to the air; or
- (ii) engaging in the discharge of radioactive material to the water; or
- (iii) engaging in the incineration of radioactive materials; or
- (iv) disposing of radioactive material in the environment; or
- (v) using in the environment radioactive material in a manner that results in deposition or release of radioactive material in the environment.

(b) Persons who obtain a permit must discharge, use, or dispose of the radioactive material as prescribed by that permit.

[Section 380-3.2 Contents of complete application for permit to discharge licensed material to the air or water.

(a) An application for a permit must satisfy the general requirements for complete applications contained in Part 621 of this Title. An application must also satisfy the information requirements in Part 201 for air discharges or Parts 750-758 for discharges to water where permits are required pursuant to these Parts, in addition to the general requirements under Part 621.

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(b) A complete application for a permit must contain information which thoroughly describes the proposed radioactive materials use, handling, and discharge procedures. The submitted information must describe the proposed operations in sufficient detail to:

(1) Enable the Department to assess the nature and extent of any potential environmental impact; and

(2) Demonstrate that the proposed discharge of licensed material will comply with the requirements of this Part; and

(3) Provide adequate justification for the proposed discharge of licensed material to the environment.

(c) A complete application for a permit must the following:

(1) An identification of each point of discharge and the effluent rate through each discharge point; and

(2) An identification of all radionuclides to be discharged, and an estimate of the total activity and average concentration of each radionuclide in the effluent through each discharge point in one year; and

(3) A description of the discharge treatment systems, if any, that will be used to minimize the radionuclides in the effluent, how such systems will be maintained, and how wastes produced during treatment will be disposed of; and

(4) If a discharge treatment system will be used, an estimate of the total annual activity and average annual concentration of each radionuclide in the effluent both before and after treatment; and

(5) Analysis and procedures to ensure that doses are maintained ALARA and within the dose limits in Section 380-5.1 of this Part; and

(6) The identification and signatures of the radiation safety officer and the managerial agent(s).]

Section 380-3.2 Permit applications.

(a) An application for a permit must satisfy the general requirements for complete applications contained in Part 621 of this Title, Uniform Procedures.

(b) An application for a permit must satisfy the requirements of Part 617 of this Title, State Environmental Quality Review, which includes the submission of a properly completed environmental assessment form.

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(c) A complete application for a permit must contain information which thoroughly describes the proposed radioactive materials use, handling, disposal, release, and/or site maintenance procedures. The submitted information must be submitted in writing, and describe the proposed operations in sufficient detail to:

(1) Demonstrate that the proposed actions will comply with this Part; and

(2) Provide adequate justification for the proposed action; and

(3) Enable the Department to assess the nature and extent of any potential environmental impact.

(d) A complete application for a permit must include the following:

(1) Procedures to ensure compliance with the requirements of this Part; and

(2) Supplemental information which the Department notifies the applicant is necessary to review the application, including program-specific application guidelines.

(e) In addition to the information required by subdivisions (c) and (d) of this section, a complete application for permits to authorize the emission of radioactive materials to the air, discharge of radioactive material to ground or surface water, or incineration of radioactive material, must also include the following:

(1) An identification of each emission or discharge point and the effluent rate through each; and

(2) An identification of all radionuclides to be emitted or discharged, and an estimate of the total activity and average concentration of each radionuclide in the effluent through each emission or discharge point in one year; and

(3) A description of the effluent treatment systems, if any, that will be used to minimize the radionuclides in the effluent, how such systems will be maintained, and how wastes produced during treatment will be disposed of; and

(4) If an effluent treatment system will be used, an estimate of the total annual activity and average annual concentration of each radionuclide in the effluent both before and after treatment.

(f) In addition to the information required by subdivisions (c) and (d) of this section, a complete application for permits to authorize the use of radioactive materials in the environment must also include the following:

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- (1) A list of all radionuclides to be used; and
- (2) The total activity of each radionuclide; and
- (3) A description of the method of use or application; and
- (4) The objective of the study to be performed, and the location of the study area(s).

(Existing section 380-3.3 remains unchanged.)

Section 380-3.3 Terms of permits.

Permits issued pursuant to this Part must be issued for a term not to exceed five years from the date of issuance unless renewed, suspended, revoked, or terminated by the Department.

Existing section 380-3.4 and 380-3.5 are amended to read as follows:

Section 380-3.4 Exemption.

Exhaust systems which [discharge licensed] release radioactive material to air that meet each of the following criteria are exempt from having to obtain a permit pursuant to this Part:

(a) The annual average concentration of [radionuclides] a single radionuclide in the effluent at the emission point [of discharge] is less than or equal to ten percent of the radionuclide concentrations listed in Table II, Column 1 of Subpart 380-11 of this Part without relying on effluent treatment.

(b) If more than one radionuclide is released at the emission point [of discharge], the following conditions must be satisfied:

(1) The fraction of the [limits] values in Table II, Column 1 of Subpart 380-11 of this Part represented by effluents to air [shall] must be determined by dividing the actual average annual concentration of each radionuclide [discharged] released by the concentration of that radionuclide listed in Table II, Column 1 of Subpart 380-11 of this Part; and

(2) The sum of the fractions for each radionuclide (required by paragraph (b)(1) of this section) does not exceed ten percent of unity without relying on effluent treatment to reduce radionuclide concentrations.

[(c) The concentration of each radionuclide in the effluent meets the concentration limits in subdivisions (a) and (b) of this section without relying on effluent treatment.]

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

Section 380-3.5 Variances.

(a) Unless otherwise precluded by law, the Department may, upon its own initiative or upon written application from any person who is subject to this Part, grant a variance from one or more specific provisions of this Part under the conditions set forth in this section.

(b) Every application for a variance must:

(1) Be submitted to the Department in writing; and

(2) Be submitted in conjunction with an application for a permit, where a permit is also required pursuant to this Part; and

(3) Identify the specific provisions of this Part from which a variance is sought; and

(4) Demonstrate that compliance with the identified provisions would, on the basis of conditions unique to the person's particular situation, tend to impose an unreasonable economic, technological, or safety burden on the person or the public; and

(5) Demonstrate that the proposed activity will have no significant adverse impact on the public health and safety and the environment, will be consistent with the provisions of the ECL, and will meet all other provisions of this Part.

(c) An application for a [permit, for approval of] variance to approve proposed procedures to [discharge or] dispose of radioactive material [subject to this Part] not otherwise authorized by Subpart 380-4 of this Part[,] must also [meet] include the following:

[(1) The application must satisfy the general requirements for complete applications contained in Part 621 of this Title; and

(2) The application must include all information required in paragraph (b) of section 380-3.2 of this Part; and

(3) The application must include:]

[[i] 1] A description of the waste containing radioactive material to be disposed of, including the physical and chemical properties relevant to risk evaluation, and the proposed manner and conditions of waste disposal; and

[[ii] 2] An analysis and evaluation of pertinent information on the nature of the environment; and

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([iii] 3) The nature and location of other potentially affected licensed and unlicensed facilities; and

([iv] 4) Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in section 380-5.1 of this Part.

(d) In granting any variance under this section, the Department may impose specific conditions necessary to assure that the subject activity will have no significant adverse impact on the public health and safety and the environment, including requiring a permit when needed. Failure to comply with such conditions is a violation of this Part.

Existing section 380-3.6 is repealed.

[Section 380-3.6 Treatment or disposal by incineration.

Licensed material may be treated or disposed of by incineration only in the amounts and forms specified in Section 380-4.3 of this Part or as specifically approved by the Department pursuant to Section 380-3.5 of this Subpart. Applications for permits to incinerate licensed material must be submitted in accordance with Section 380-3.2 of this Subpart.]

Existing sections 380-4.1 through 380-4.3 are amended to read as follows:

SUBPART 380-4 WASTE DISPOSAL

Section 380-4.1 [General Disposal Requirements] Authorized disposal methods.

(a) [No person shall dispose of radioactive material subject to this Part, except by:] Persons subject to this Part must dispose of radioactive material only by:

(1) Transfer to an authorized recipient [pursuant to 0 NYCRR Part 16, 12 NYCRR Part 38, Article 175 of the New York City Health Code, or 10 CFR Part 20 (see section 380-1.6 of this Part)] as provided in section 381.12 of this title or any applicable municipal, state, or federal law; or

(2) Decay in storage, where the storage is authorized by and in conformance with relevant requirements of state and federal law; or

(3) [Disposal or discharge] Release to the environment within the limits in section 380-5.1 of this Part and in accordance with Subpart 380-3 of this Part; or

(4) [Disposal at a land disposal facility authorized by applicable state or federal law to accept the radioactive material for permitted pursuant to Part 383 of this Title, licensed by an agreement state or the U.S. Nuclear Regulatory Commission, or operated by the U.S.

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

Department of Energy.] Transfer to a facility authorized by applicable state or federal law to accept the radioactive material for storage, treatment or disposal; or

(5) Incineration as authorized by and in conformance with a permit issued pursuant to section 380-3.1 of this Part; or

(6) As authorized under section 380-4.2 or section 380-4.3 of this Part.

[(b) There shall be no land disposal of radioactive material subject to this Part except as authorized pursuant to this Part and any other applicable provisions of this Title.]

Section 380-4.2 Disposal by release into sanitary sewerage.

(a) Licensed material may be released into sanitary sewerage if each of the following conditions is satisfied:

(1) The material is:

(i) Readily soluble in water; or

(ii) Biological material that is readily dispersible in water; and

(2) The quantity of licensed or other radioactive material released into the sewer in 1 month divided by the average monthly volume of water released into the sewer does not exceed the concentration listed in Table III of Subpart 380-11 of this Part; and

(3) If more than one radionuclide is released, the following conditions must also be satisfied:

(i) The fraction of the limit in Table III of Subpart 380-11 of this Part represented by [discharges] releases into sanitary sewerage [shall] must be determined by dividing the actual monthly average concentration of each radionuclide released into the sewer by the concentration of that radionuclide listed in Table III of Subpart 380-11 of this Part; and

(ii) The sum of the fractions for each radionuclide required by paragraph (a)(3)(i) of this section does not exceed unity; and

(4) The total quantity of licensed and other radioactive material released into the sanitary sewerage system in a year does not exceed 5 curies (185 GBq) of hydrogen-3, 1 curie (37 GBq) of carbon-14, and 1 curie (37 GBq) of all other radioactive materials combined.

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

(b) Excreta from individuals undergoing medical diagnosis or therapy with radioactive material is not subject to the limitations contained in paragraph (a) of this section.

(c) The Department may impose additional restrictions on the release of licensed material into sanitary sewerage in order to minimize or avoid adverse environmental impacts if:

(1) the material [is found to precipitate] is, or has the potential to be, concentrated in the sewage treatment plant sludge; or

(2) the sludge is incinerated, and the material is [found to] , or has the potential to be, concentrated in the ash.

Section 380-4.3 Disposal of specific wastes.

(a) The following licensed material may be disposed of without regard to its radioactivity, but must be disposed of in accordance with any other applicable provisions of the ECL:

(1) 0.05 microcurie (1.85 kBq), or less, of hydrogen-3 or carbon-14 per gram of medium used for liquid scintillation counting; and

(2) 0.05 microcurie (1.85 kBq), or less, of hydrogen-3 or carbon-14 per gram of animal tissue, averaged over the weight of the entire animal[.] and

(3) 0.05 microcurie (1.85 kBq), or less, of hydrogen-3 or carbon-14 per gram of biodegradable animal bedding.

(b) Tissue disposed of under paragraph (a) of this section [shall] must not be disposed of in a manner that would permit its use either as food for humans or as animal feed.

(c) Records [shall] must be maintained in accordance with section 380-8.5 of this Part.

(Existing section 380-4.4 remains unchanged.)

Section 380-4.4 Compliance with environmental and health protection regulations.

Nothing in this Subpart relieves any person subject to this Part from complying with other applicable Federal, State, and local regulations governing any other toxic or hazardous properties of materials that may be disposed of under this Subpart.

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

Existing subdivision 380-5.1(a) is amended to read as follows:

SUBPART 380-5 RADIATION DOSE LIMITS FOR INDIVIDUAL MEMBERS OF THE PUBLIC

Section 380-5.1 Dose limits for individual members of the public.

(a) Each person subject to this Part [shall] must limit disposals and [discharges] releases of radioactive material subject to this Part to the environment so that:

(1) The total effective dose equivalent to individual members of the public from the disposal or release does not exceed 0.1 rem (1 mSv) in a year, exclusive of the dose contributions from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released in accordance with a license, from voluntary participation in medical research programs, and from [the] a licensee's disposal of licensed material into sanitary sewerage in accordance with section 380-4.2 of this Part; and

(2) The dose in any unrestricted area in the environment from external sources does not exceed 0.002 rem (0.02 mSv) in any one hour; and

(3) Doses to individual members of the public are as low as reasonably achievable (ALARA).

New subdivision 380-5.1(b) is adopted to read as follows:

(b) Constraint on airborne emissions.

To implement the ALARA requirements of section 380-7.2 of this Part, and notwithstanding the requirements in section 380-5.1 of this Part, a constraint on airborne emissions of radioactive material to the environment, excluding radon-222 and its decay products, must be established by permittees such that the individual member of the public likely to receive the highest dose will not be expected to receive a total effective dose equivalent in excess of 10 mrem (0.1 mSv) per year from these emissions. If a permittee subject to this requirement exceeds this dose constraint, the permittee must report the exceedance as provided in Subparts 380-8 and 380-9 of this Part and promptly take appropriate corrective action to ensure against recurrence.

Existing subdivision 380-5.1(b) is renumbered 380-5.1(c) and is amended to read as follows:

([b]c) If [the] a licensee permits members of the public to have access to restricted areas in the environment, the limits for members of the public continue to apply to those individuals.

PRELIMINARY DRAFT: Proposed changes to Part 380 are marked on this copy. Words to be deleted are in brackets []. Words to be added are underlined.

Existing subdivision 380-5.1(c) is repealed.

[(c) In addition to the requirements of this Part, a licensee subject to the provisions of the U.S. Environmental Protection Agency's generally applicable environmental radiation standards in 40 CFR Part 190 shall comply with those standards.]

Existing subdivision 380-5.1(d) is amended to read as follows:

(d) The Department may impose additional restrictions on radiation levels in unrestricted areas in the environment and on the total quantity of radionuclides that [a licensee] may [dispose of or discharge] be disposed of or released in effluents in order to restrict collective dose.

Existing subdivisions 380-5.2(a) and (b) are amended to read as follows:

Section 380-5.2 Compliance with dose limits for individual members of the public.

(a) Each person subject to this Part [shall] must make or cause to be made, as appropriate, surveys of radiation levels in unrestricted areas in the environment and radioactive materials in effluents released to unrestricted areas in the environment to demonstrate compliance with the dose limits for individual members of the public in section 380-5.1 of this Part.

(b) [The person shall] Surveys must show compliance with the annual dose limit in section 380-5.1 of this Part by:

(1) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the [discharge or] disposal or release does not exceed the annual dose limit; or

(2) Demonstrating that:

(i) The annual average concentrations of [licensed] radioactive material [discharged] released in effluents to air or water at the emission point or point of discharge do not exceed the values specified in Table II of Subpart 380-11 of this Part; and

(ii) If an individual were continually present in an unrestricted area, the dose from external sources would not exceed 0.002 rem (0.02 mSv) in an hour and 0.05 rem (0.5 mSv) in a year.

(Existing subdivision 380-5.2(c) remains unchanged.)

(c) Upon approval from the Department, a permittee may adjust the effluent concentration values in Table II of Subpart 380-11 of this Part, for members of the public, to

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take into account the actual physical and chemical characteristics of the effluents (e.g., aerosol size distribution, solubility, density, radioactive decay equilibrium, chemical form). Nothing in this subdivision alters the requirements of section 380-5.1 of this Part.

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Subpart 380-6 through Section 380-9.1 are amended to read as follows:

SUBPART 380-6 SURVEYS AND [MONITORING] CALIBRATIONS

Section 380-6.1 Surveys required.

Each person subject to this Part must [shall] make or cause to be made, surveys that:

(a) Are necessary to [comply] demonstrate compliance with [the regulations in] this Part; and

(b) Are reasonable, in scope and method, [under the circumstances] to evaluate:

(1) [Radiation] The magnitude and extent of radiation levels in the environment; and

(2) Concentrations or quantities of radioactive material in effluents, used in the environment, or disposed of in the environment; and

(3) The potential radiological hazards [that could be present] and environmental impacts.

Section 380-6.2 Calibration of instruments.

[The] Each person subject to this Part must [shall] ensure that instruments and equipment used for quantitative radiation measurements (e.g., dose rate and effluent monitoring) are calibrated at least annually for the radiation measured. Instruments used to measure effluent flow rates must also be calibrated annually.

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SUBPART 380-7 DISCHARGE MINIMIZATION PROGRAMS

Section 380-7.1 Discharge minimization program required.

Each permittee [shall] must develop, document, and implement a discharge minimization program for maintaining [discharges] releases of [licensed] radioactive material to the environment as low as is reasonably achievable (ALARA). The discharge minimization program:

(a) May be part of the radiation protection (ALARA) program required as part of the license; and

(b) Must be commensurate with the scope and extent of [licensed] permitted activities and sufficient to ensure compliance with the provisions of this Part.

Section 380-7.2 Procedures and engineering controls.

The permittee [shall] must use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve doses to members of the public that are as low as is reasonably achievable (ALARA).

Section 380-7.3 Periodic reviews

The permittee [shall] must, at intervals not to exceed 12 months, review the discharge minimization program content and implementation.

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SUBPART 380-8 RECORDS

Section 380-8.1 General provisions.

(a) Each person [shall] subject to this Part must use the units of curie, rad, rem, or the SI units of becquerel, gray, sievert, including multiples and subdivisions thereof, and [shall] must clearly indicate the units of all quantities on records required by this Part.

(b) In the records required by this Part, quantities may be recorded in SI units in parentheses following each of the units specified in paragraph (a) of this section. However, all quantities must be recorded as stated in paragraph (a) of this section.

([b]c) The person [shall] must make a clear distinction among the quantities entered on the records required by this Part (e.g., total effective dose equivalent, shallow-dose equivalent, [eye] lens dose equivalent, deep-dose equivalent, committed effective dose equivalent).

([c]d) The person [shall] must retain the records required by this Subpart for 3 years after the record is made, or[,] until the licensing agency terminates each pertinent license requiring the record, whichever is longer.

Section 380-8.2 Records of discharge minimization programs.

Each [person shall] permittee must maintain records of the discharge minimization program, including:

- (a) The provisions of the program; and
- (b) Audits and other reviews of program content and implementation.

Section 380-8.3 Records of surveys and calibrations.

(a) Each person subject to this Part must [shall] maintain records showing the results of [surveys and] calibrations required by Subpart 380-6 of this Part.

(b) [The] Each person subject to this Part must [shall] maintain records of the results of measurements and calculations used to evaluate the discharge of radioactive effluents to the environment, or the use of radioactive material in the environment, including protocols for sample collections and analysis.

Section 380-8.4 Records of dose to individual members of the public.

Each person [shall] must maintain records sufficient to demonstrate compliance with the dose limit for individual members of the public specified in section 380-5.1 of this Part.

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Section 380-8.5 Records of waste disposal.

Each person [shall] must maintain records of the disposal [and discharge] of radioactive materials made under [Subparts 380-3, 380-4, and 380-7] sections 380-3.5, 380-4.2, and 380-4.3 of this Part, including existing records of burials in soil authorized before April 1985*.

Section 380-8.6 Form of records.

(a) Each record required by this Part must be legible throughout the specified retention period. The record may be maintained in the following forms:

(1) original; or

(2) a reproduced copy or a microform, provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of producing a clear copy throughout the required retention period; or

(3) in electronic media with the capability for producing legible, accurate, and complete records during the required retention period.

(b) Records, such as letters, drawings, and specifications, must include all pertinent information, such as stamps, initials, dates, and signatures. [The radiation installation shall] Persons subject to this Part must maintain adequate safeguards against tampering with and loss of records.

(c) Raw data pertaining to surveys of radioactive discharges required by Subpart 380-8.3 of this Part that are stored in an electronic form must also be made available in a printed copy form when requested by the Department.

Section 380-8.7 Transfer of Permit.

If permitted activities are transferred pursuant to Part 621 of this Title, the permittee must transfer all records required by sections 380-8.3 and 380-8.5 to the new permittee and the new permittee will be responsible for maintaining these records.

* A previous 6 NYCRR Section 380.3 permitted burial of small quantities of licensed materials in soil before April 1985, without specific Department authorization.

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SUBPART 380-9 REPORTS

Section 380-9.1 Annual reports.

[(a)] Each person who has obtained a permit [for the disposal or discharge of licensed material to the environment pursuant to] under Subpart 380-3 of this Part must submit to the Department an annual report on these radioactive [discharges] releases or disposals during the previous calendar year. The report must list the radionuclides [discharged] released or disposed of, and the total quantity and the average annual concentrations of each. Permittees that have installed fixed environmental dosimeters in accordance with a permit must also report all dosimetry results. This report must be submitted by the end of each March as described in section 380-1.3 of this Part.

[(b)] All persons required to make reports under subdivision (a) of this Section shall submit the report in writing to the New York State Department of Environmental Conservation, Bureau of Radiation, Division of Hazardous Substances Regulation, 625 Broadway, Albany, New York 12233-7255.]

Existing section 380-9.2 is repealed. New section 380-9.2 is adopted to read as follows:

[Section 380-9.2 Notification of incidents.

(a) Immediate notification. Notwithstanding any other requirements for notification, each person shall immediately report any event involving loss of control of licensed material that may have caused the release of radioactive material to the environment, so that, had an individual been present for 24 hours, the individual could have received an intake five times the occupational annual limit on intake.

(b) Twenty-four hour notification. Each person shall, within 24 hours of discovery of the event, report any event involving loss of control of licensed material that may have caused the release of licensed material to the environment, so that, had an individual been present for 24 hours, the individual could have received an intake in excess of one occupational annual limit on intake.

(c) The person shall prepare any notification report filed with the Department pursuant to this section so that names of individuals who have received exposure to radiation or radioactive material are stated in a separate and detachable part of the report.

(d) Persons shall make the notification reports required by subdivisions (a) and (b) of this section by telephone to the Department's Bureau of Radiation during normal business hours or to the Department's Spill Hotline during off-hours and by telegram, mailgram, or facsimile to the New York State Department of Environmental Conservation, Bureau of Radiation, Division of Hazardous Substances Regulation, 50 Wolf Road, Albany, New York

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12233-7255. To the extent that the information is available at the time of notification, the information provided in these reports must include:

- (1) The caller's name and call back telephone number; and
- (2) A description of the event, including date and time; and
- (3) The exact location of the event; and
- (4) The isotopes, quantities, and chemical, physical, and biological form of the licensed material involved; and
- (5) Any radiation exposure data available.]

Section 380-9.2 Reports of incidents.

(a) Immediate report. Each person must notify the Department as soon as possible but not later than 4 hours after the discovery of an event that prevents immediate protective actions necessary to avoid uncontrolled releases of radioactive material to the environment (events may include fires, floods, explosions, toxic gas releases, etc.). Immediate reports must be made by telephone as described in section 380-1.3 of this Part.

(b) Report on next business day. Each person must notify the Department by telephone by no later than the next business day after the discovery of any of the following events involving radioactive material:

- (1) An unplanned contamination event that occurs in the environment;
- (2) An event in which equipment is disabled or fails to function as designed when the equipment is required by regulation or permit condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident;
- (3) An unplanned fire or explosion damaging any radioactive material or any device, container, or equipment containing radioactive material when the event created a potential for an uncontrolled release to the environment;
- (4) Any lost, stolen, or missing radioactive material under such circumstances that it appears the material may have been released to the environment or disposed of in a manner not authorized under Subpart 380-4 of this Part;
- (5) Any exceedance of the annual release limit established in a permit;

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(6) An exceedance of the dose constraint for airborne emissions established by subdivision 380-5.1(b) of this Part; or

(7) Any regulatory limits specified in this Part.

Existing paragraphs 380-9.3(a)(1) through (4) are repealed.

[Section 380-9.3 Reports of exposures, radiation levels, and concentrations of radioactive material exceeding the limits.

(a) Reportable events. In addition to the notification required by Section 380-9.2 of this Part, each person shall submit a written report within 30 days after learning of any of the following occurrences:

(1) Any incident for which notification is required by section 380-9.2 of this Part; or

(2) Doses in excess of the limits for an individual member of the public in section 380-5.1 of this Part; or

(3) Levels of radiation or concentrations of radioactive material in an unrestricted area in excess of 10 times any applicable limit set forth in this Part, in the license, or in the permit (whether or not involving exposure of any individual in excess of the limits in section 380-5.1 of this Part); or

(4) For licensees subject to the provisions of the U.S. Environmental Protection Agency's generally applicable environmental radiation standards in 40 CFR Part 190, levels of radiation or discharges of radioactive material in excess of those standards, or of the license or permit conditions related to those standards (see section 380-1.6 of this Part).]

New section 380-9.3 is adopted to read as follows:

Section 380-9.3 Contents of Reports.

(a) Telephoned reports. To the extent that the information is available at the time of notification, the information provided in telephoned reports must include:

(1) The caller's name and call back telephone number;

(2) A description of the event, including date and time;

(3) The exact location of the event;

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(4) The isotopes, quantities, and chemical and physical form of the radioactive material involved;

(5) Any data available on environmental contamination levels; and

(6) A description of any corrective or mitigating actions taken.

(b) Written reports.

Each person required to make a telephoned report under section 380-9.2 of this Part must, within 30 days after making the telephone report, submit a written report setting forth the following information, unless otherwise directed by the Department. Written reports prepared pursuant to other regulations may be submitted to fulfill this requirement if the reports contain all of the necessary information and the appropriate distribution is made. These written reports must be sent to the Department as described in section 380-1.3 of this Part.

(1) A description of the event, including, the date and time, the probable cause, and the manufacturer and model number (if applicable) of any equipment that failed or malfunctioned;

(2) The exact location of the event;

(3) A description of the radioactive material involved, including the isotopes, quantity, and chemical and physical form;

(4) An assessment of any environmental contamination including the results of any surveys performed, samples analyzed, and pathway analyses;

(5) An assessment of the potential radiation dose to the public;

(6) Remedial or mitigation measures undertaken or planned and the results of any evaluations or assessments of those measures; and

(7) Corrective actions taken or planned to ensure against a recurrence, including the schedule for achieving conformance with applicable limits, generally applicable environmental standards, and associated permit conditions.

(8) Reports of the loss or theft of radioactive material must also contain the following information:

(i) The circumstances under which any loss or theft occurred; and

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(ii) A statement of the disposition, or probable disposition, of the radioactive material involved; and

(iii) Actions that have been taken, or will be taken, to recover the material; and

(iv) Procedures or measures that have been, or will be, adopted to prevent a recurrence of the loss or theft of radioactive material.

(c) Followup Reports

Subsequent to filing the written report, the person shall also report any additional substantive information on the event, loss, or theft within 30 days after the person learns of such information.

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SUBPART 380-10 GENERAL REGULATORY REQUIREMENTS

Existing section 380-10.1 is amended to read as follows:

Section 380-10.1 Additional requirements.

The Department may, by rule, regulation, or order, impose upon any person subject to this Part such requirements in addition to those established in the regulations in this Part as it deems appropriate or necessary to protect public health and safety or the environment from the disposal or [discharge] release of radioactive material to the environment.

Existing paragraph 380-10.2(a)(1) is amended to read as follows:

Section 380-10.2 Enforcement and inspection and access to records.

(a) Enforcement.

(1) Every person who disposes of or [discharges] releases radioactive material subject to this Part within the State, or whose loss of control of [licensed] radioactive material may result in the [disposal or discharge] uncontrolled release of such material to the environment within the State, is subject to every applicable requirement identified in this Part, [subject to a demonstration] unless the person demonstrates to the [Department] Department's satisfaction that the person or facility is clearly exempt from regulation under, or from the requirement in question that is contained in, this Part.

(Existing paragraph 380-10.2(a)(2) remains unchanged.)

(2) Without limitation to any other civil or criminal sanction that may be applicable, any person who violates any provision of, or fails to perform any duty imposed by this Part, or any term or condition of any permit issued pursuant to this Part, or any final determination or order of the Commissioner of the New York State Department of Environmental Conservation issued pursuant to any statutory authority under which this Part is promulgated, is subject to all applicable civil, administrative, and criminal sanctions set forth in ECL Article 71.

Existing subdivision 380-10.2(b) through section 380-10.5 are amended to read as follows:

(b) Inspection and access to records.

(1) [The Department] An authorized representative of the Department may enter any property or premises where radioactive material subject to this Part is disposed of or [discharged] released to the environment during normal business hours or at any other time during which regulated activity is reasonably believed to be occurring, for the purpose of inspecting such facility, property or premises to determine compliance, subject to the

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limitations set forth [below] in this subdivision. Such entry [shall] will be accomplished with the minimum disruption to operations at the facility.

(2) Inspections [shall] will be limited to areas or places where regulated activity or contamination or pollution is occurring or reasonably believed to be occurring.

(3) All records required to be maintained under this Part must be furnished upon request, within a [reasonable period of time] time frame specified by the Department. Inspections of records and documents required to be maintained under this Part [shall] will occur at the location where such records are maintained or at a reasonable time and place specified by the Department. [To the extent that records required to be maintained under this Part are maintained on computer databases, the Department shall be provided with direct electronic access to such databases.]

(4) Except as provided for in paragraph (5) [herein] of this subdivision, inspections [shall] will be limited in frequency, duration, and scope [by] based on the following factors:

- (i) potential environmental harm of the regulated activity;
- (ii) complexity of the regulated activity and the time needed to determine compliance;
- (iii) specific federal or state inspection mandates;
- (iv) noncompliance history of the facility;
- (v) existence or need for permits;
- (vi) information received concerning noncompliance;
- (vii) self-reported violations or releases that require a response by the Department; and
- (viii) need to follow up previous inspections which uncovered noncompliance with additional inspections.

(5) Notwithstanding paragraph (4) [above] of this subdivision, inspections by the Department may occur with greater frequency when:

- (i) a permit, license, or order authorizes more frequent inspection; and
- (ii) the Department has a reasonable basis to determine inspection is warranted in order to make a compliance determination.

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Section 380-10.3 Tests.

Each person subject to this Part [shall] must perform upon instructions from the Department, or [shall] must [permit] allow the Department to perform, such reasonable tests as the Department deems appropriate or necessary including, but not limited to, tests of:

- (a) [Licensed] Radioactive material;
- (b) Facilities wherein [licensed] radioactive material is used or stored;
- (c) Radiation detection and monitoring instruments; and
- (d) Other equipment and devices used in connection with utilization or storage of [licensed] radioactive material.

Section 380-10.4 Vacating premises.

Each [person subject to this Part shall] permittee must, no less than 30 days before vacating or relinquishing possession or control of premises which may have been contaminated with [licensed] radioactive material, notify the Department in writing of intent to vacate. When necessary to meet the requirements of this Part, the permittee [shall] must [decontaminate the premises] remediate any environmental contamination in such a manner as the Department may specify.

Section 380-10.5 Safeguarding information.

Any requests for the release of information in the custody of the Department related to this Part [shall] will be handled according to the provisions of New York Public Officers Law section 87 and Part 616 of this Title, Public Access to Records of the Department.

(Existing section 380-10.6 remains unchanged.)

Section 380-10.6 Impounding.

The Department may impound sources of radiation when it determines such action is necessary to protect the public health and safety and the environment.

New sections 380-10.7 through 380-10.9 are adopted to read as follows:

Section 380-10.7 Completeness and accuracy of information.

(a) Information provided to the Department by an applicant for a permit, or by a permittee, or information required by statute or by the Department's regulations, orders, or

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permit conditions to be maintained by the applicant or the permittee, must be complete and accurate in all material respects.

(b) Each applicant or permittee must notify the Department of information identified by the applicant or permittee as having, for the regulated activity, a significant implication for public health and safety or protection of the environment. An applicant or permittee violates this paragraph only if the applicant or permittee fails to notify the Department of information that the applicant or permittee has identified as having a significant implication for public health and safety or protection of the environment. Notification must be provided to the Department within two working days of identifying the information. This requirement is not applicable to information which is already required to be provided to the Department by other reporting or updating requirements.

Section 380-10.8 Deliberate misconduct.

(a) This section applies to the following parties and their employees:

(1) permittees;

(2) applicants for permits; and

(3) contractors (including suppliers and consultants) and subcontractors of any permittee or applicant for a permit who knowingly provide to the permittee, applicant, contractor, or subcontractor, any components, equipment, materials, or other goods or services that relate to a permittee's or applicant's activities under this Part.

(b) The parties listed in subdivision (a) of this section, must not:

(1) Engage in deliberate misconduct that causes or would have caused, if not detected, a permittee or applicant to be in violation of any rule, regulation, order, or permit issued under this Part; or

(2) Deliberately submit to the Department, a permittee, an applicant, or a permittee's, contractor or subcontractor, information that the person submitting the information knows to be incomplete or inaccurate in some respect material to the Department.

(c) For the purposes of paragraph (a)(1) of this section, deliberate misconduct by a person means an intentional act or omission that the person knows:

(1) Would cause a permittee or applicant to be in violation of any rule, regulation, order, or permit issued under this Part; or

(2) Constitutes a violation of a requirement, procedure, instruction, contract, purchase order, or policy of a permittee, applicant, contractor, or subcontractor.

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(d) A person who violates paragraph (a)(1) or (a)(2) of this section may be subject to enforcement action and penalties as authorized by the ECL.

Section 380-10.9 Prohibitions.

(a) No person shall cause or allow an uncontrolled release, loss of control, transfer to an unauthorized person, or abandonment of radioactive material.

(b) It is a violation of this Part to do any act prohibited by any provision hereof; or to fail to any act required by any provision hereof.

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Existing section 380-11.1 is amended to read as follows:

SUBPART 380-11 ANNUAL LIMITS ON INTAKE (ALI) AND DERIVED AIR CONCENTRATIONS (DAC) OF RADIONUCLIDES FOR OCCUPATIONAL EXPOSURE; EFFLUENT CONCENTRATIONS; CONCENTRATIONS FOR RELEASE TO SEWERAGE

Section 380-11.1 Introduction

The regulations in this Part establish standards for protection against ionizing radiation resulting from the disposal and [discharge] release of radionuclides to the environment. [The occupational values listed in Table I only apply to section 380-9.2 of this Part.] The concentration values listed in Tables II and III are used to control the discharge of radionuclides to the environment in such a manner that the total dose to an individual member of the public does not exceed the limits prescribed in Subpart 380-5 of this Part.

For each radionuclide, Table I indicates the chemical form which is to be used for selecting the appropriate ALI or DAC value. The ALIs and DACs for inhalation are given for an aerosol with an activity median aerodynamic diameter (AMAD) of 1µm and for three classes (D,W,Y) of radioactive material, which refer to their retention (approximately days, weeks or years) in the pulmonary region of the lung. This classification applies to a range of clearance halftimes for D of less than 10 days, for W from 10 to 100 days, and for Y greater than 100 days. The class (D,W, or Y) given in the columns headed "class" applies only to the inhalation ALIs and DACs given in Table I, Columns 2 and 3.

For each radionuclide, Table II provides concentration values for airborne and liquid effluents released to the general environment. Table III provides concentration limits for [discharges] releases to sanitary sewer systems.

(Existing sections 380-11.2 through 380-11.5 remain unchanged.)

Section 380-11.2 Notation

The values in Tables I, II, and III are presented in the computer "E" notation. In this notation a value of 6E-02 represents a value of 6×10^{-2} or 0.06, 6E+2 represents 6×10^2 or 600, and 6E+0 represents 6×10^0 or 6.

Section 380-11.3 Table I Occupational Values

Note that the columns in Table I of this appendix captioned "Oral Ingestion ALI," "Inhalation ALI," and "DAC," are applicable to occupational exposure to radioactive material.

The ALIs in this appendix are the annual intakes of given radionuclide by "Reference Man" which would result in either (1) a committed effective dose equivalent of 5 rems

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(stochastic ALI) or (2) a committed dose equivalent of 50 rems to an organ or tissue (non-stochastic ALI). The stochastic ALIs were derived to result in a risk, due to irradiation of organs and tissues, comparable to the risk associated with deep dose equivalent to the whole body of 5 rems. The derivation includes multiplying the committed dose equivalent to an organ or tissue by a weighting factor, w_T . This weighting factor is the proportion of the risk of stochastic effects resulting from irradiation of the organ or tissue, T, to the total risk of stochastic effects when the whole body is irradiated uniformly. The values of w_T are listed under the definition of weighting factor in section 380-2.1 of this Part. The non-stochastic ALIs were derived to avoid non-stochastic effects, such as prompt damage to tissue or reduction in organ function.

A value of $w_T = 0.06$ is applicable to each of the five organs or tissues in the "remainder" category receiving the highest dose equivalents, and the dose equivalents of all other remaining tissues may be disregarded. The following parts of the GI tract -- stomach, small intestine, upper large intestine, and lower large intestine -- are to be treated as four separate organs.

Note that the dose equivalents for extremities (hands and forearms, feet and lower legs), skin, and lens of the eye are not considered in computing the committed effective dose equivalent, but are subject to limits that must be met separately.

When an ALI is defined by the stochastic dose limit, this value alone, is given. When an ALI is determined by the non-stochastic dose limit to an organ, the organ or tissue to which the limit applies is shown, and the ALI for the stochastic limit is shown in parentheses. (Abbreviated organ or tissue designations are used: LLI wall = lower large intestine wall; St. wall = stomach wall; Blad wall = bladder wall; and Bone surf = bone surface.)

The use of the ALIs listed first, the more limiting of the stochastic and non-stochastic ALIs, will ensure that non-stochastic effects are avoided and that the risk of stochastic effects is limited to an acceptably low value. If, in a particular situation involving a radionuclide for which the non-stochastic ALI is limiting, use of that non-stochastic ALI is considered unduly conservative, the licensee may use the stochastic ALI to determine the committed effective dose equivalent. However, the licensee shall also ensure that the 50-rem dose equivalent limit for any organ or tissue is not exceeded by the sum of the external deep dose equivalent plus the internal committed dose to that organ (not the effective dose). For the case where there is no external dose contribution, this would be demonstrated if the sum of the fractions of the nonstochastic ALIs (ALIs_{ins}) that contribute to the committed dose equivalent to the organ receiving the highest dose does not exceed unity (i.e., $\Sigma (\text{intake (in } \mu\text{Ci) of each radionuclide} / \text{ALI}_{\text{ins}}) < 1.0$). If there is an external deep dose equivalent contribution of H_d then this sum must be less than $1 - (H_d/50)$ instead of being < 1.0 .

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Note that the dose equivalents for extremities (hand and forearms, feet and lower legs), skin, and lens of the eye are not considered in computing the committed effective dose equivalent, but are subject to limits that must be met separately.

The derived air concentration (DAC) values are derived limits intended to control chronic occupational exposures. The relationship between the DAC and the ALI is given by: $DAC = ALI(\text{in } \mu\text{Ci}) / (2000 \text{ hours per working year} \times 60 \text{ minutes/hour} \times 2 \times 10^4 \text{ ml per minute}) = [ALI / 2.4 \times 10^9] \mu\text{Ci/ml}$, where 2×10^4 ml per minute is the volume of air breathed per minute at work by "Reference Man" under working conditions of "light work."

The DAC values relate to one of two modes of exposure: either external submersion or the internal committed dose equivalents resulting from inhalation of radioactive materials. Derived air concentrations based upon submersion are for immersion in a semi-infinite cloud of uniform concentration and apply to each radionuclide separately.

The ALI and DAC values relate to exposure to the single radionuclide named, but also include contributions from the in-growth of any daughter radionuclide produced in the body by the decay of the parent. However, intakes that include both the parent and daughter radionuclides should be treated by the general method appropriate for mixtures.

The value of ALI and DAC do not apply directly when the individual both ingests and inhales a radionuclide, when the individual is exposed to a mixture of radionuclides by either inhalation or ingestion or both, or when the individual is exposed to both internal and external irradiation. When an individual is exposed to radioactive materials which fall under several of the translocation classifications (i.e., Class D, Class W, or Class Y) of the same radionuclide, the exposure may be evaluated as if it were a mixture of different radionuclides.

It should be noted that the classification of a compound as Class D, W, or Y is based on the chemical form of the compound and does not take into account the radiological half-life of different radioisotopes. For this reason, values are given for Class D, W, and Y compounds, even for very short-lived radionuclides.

Section 380-11.4 Table II Effluent Concentrations

The columns in Table II of this subpart captioned "Effluents," "Air," and "Water," are applicable to the assessment and control of dose to the public, particularly in the implementation of the provisions of section 380-5.2 of this Part. The concentration values given in Columns 1 and 2 of Table II are equivalent to the radionuclide concentrations which, if inhaled or ingested continuously over the course of a year, would produce a total effective dose equivalent of 0.05 rem (50 millirems or 0.5 millisieverts) to "reference man," except for noble gasses. For noble gasses, the concentration values given in Column 1 of Table II are equivalent to the radionuclide concentration that would produce a total effective dose equivalent of 0.10 rem (100 millirems or 1 millisieverts) due to submersion.

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Consideration of non-stochastic limits has not been included in deriving the air and water effluent concentration limits because non-stochastic effects are presumed not to occur at the dose levels established for individual members of the public. For radionuclides, where the non-stochastic limit was governing in deriving the occupational DAC, the stochastic ALI was used in deriving the corresponding airborne effluent limit in Table II. For this reason, the DAC and airborne effluent limits are not always proportional.

The air concentration values listed in Table II, Column 1, were derived by one of two methods. For those radionuclides for which the stochastic limit is governing, the occupational stochastic inhalation ALI was divided by 2.4×10^9 , relating the inhalation ALI to the DAC, as explained above, and then divided by a factor of 300. The factor of 300 includes the following components: a factor of 50 to relate the 5-rem annual occupational dose limit to the 0.1-rem limit for members of the public, a factor of 3 to adjust for the difference in exposure time and the inhalation rate for a worker and that for members of the public; and a factor of 2 to adjust the occupational values (derived for adults) so that they are applicable to other age groups.

For those radionuclides for which submersion (external dose) is limiting, the occupational DAC in Table I, Column 3, was divided by 219. The factor of 219 is composed of a factor of 50, as described above, and a factor of 4.38 relating occupational exposure for 2,000 hours per year to full-time exposure (8,760 hours per year). Note that an additional factor of 2 for age considerations is not warranted in the submersion case.

The water concentrations were derived by taking the most restrictive occupational stochastic oral ingestion ALI and dividing by 7.3×10^7 . The factor of 7.3×10^7 (ml) includes the following components: the factors of 50 and 2 described above and a factor of 7.3×10^5 (ml) which is the annual water intake of "Reference Man."

Note 2 of this Subpart provides groupings of radionuclides which are applicable to unknown mixtures of radionuclides. These groupings (including occupational inhalation ALIs and DACs, air and water effluent concentrations and sewerage) require demonstrating that the most limiting radionuclides in successive classes are absent. The limit for the unknown mixture is defined when the presence of the one of the listed radionuclides cannot be definitely excluded as being present either from knowledge of the radionuclide composition of the source or from actual measurements.

Section 380-11.5 Table III Releases to Sewer

The monthly average concentration limits for release to sanitary sewers are applicable to the provisions in section 380-4.2 of this Part. The concentration values were derived by taking the most restrictive occupational stochastic oral ingestion ALI and dividing by 7.3×10^6 (ml). The factor of 7.3×10^6 (ml) is composed of a factor of 7.3×10^5 (ml), the annual water intake by "Reference Man," and a factor of 10, such that the concentrations, if the

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sewage released by the licensee were the only source of water ingested by a reference man during a year, would result in a committed effective dose equivalent of 0.5 rem.

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Existing Section 380-11.6 is amended, to add the elements Nitrogen and Oxygen alphabetically to the List of Elements, as follows:

Section 380-11.6 List of Elements.

Name	Atomic Symbol	Atomic Number
*****	**	**
<u>Nitrogen</u>	<u>N</u>	<u>7</u>
*****	**	**
<u>Oxygen</u>	<u>O</u>	<u>8</u>

Existing Section 380-11.7 is amended, to add the radionuclides Nitrogen-13 and Oxygen-15 by atomic number to the Tables of Concentrations, as follows:

Section 380-11.7 Tables of Concentrations .

Section 380-11.7 Tables of Concentrations		Table I Occupational Values			Table II Effluent Concentrations		Table III Releases to Sewers
Atomic Radionuclide No.	Class	Col. 1 Oral Ingestion ALI (μCi)	Col. 2 Inhalation		Col. 1 Air (μCi/ml)	Col. 2 Water (μCi/ml)	Monthly Average Concentration (μCi/ml)
			ALI (μCi)	DAC (μCi/ml)			
7	Nitrogen-13	Submersion ¹	-	-	4E-6	2E-8	-
8	Oxygen-15	Submersion ¹	-	-	4E-6	2E-8	-