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Subject: Washington's Final Rules to Incorporate RATS ID: 2008-1
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Attachments: [Final Rule Language for 2008-1.pdf](#)
[Compatibility Comments and Response 2008-1.docx](#)

Attached to this e-mail, is our final rule revisions to Washington's Radiological Health Rules to adopt RATS ID 2008-1, Occupational Dose Records, Labeling Containers, and the Total Effective Dose Equivalent. This rulemaking changes the following chapters:

- Chapter 246-220 WAC, Radiation protection – general provisions;
- Chapter 246-221 WAC, Radiation protection standards;
- Chapter 246-222 WAC, Radiation protection – worker rights; and
- WAC 246-240-028, Exemptions regarding Type A specific licenses of broad scope.

For language or punctuation we are deleting, it has a solid line through it and new language or punctuation is underlined.

We received your letter dated July 3, 2013 indicating you had three comments on our proposed rule revisions. We needed to fix three definitions because the formula symbols were not correct. We have made those corrections.

We believe these final rule revisions satisfy the compatibility and health and safety categories established in the Office of Federal and State Materials and Environmental Programs (FSME) Procedure SA-200.

If you have any questions, please contact Michelle Austin, Rules Coordinator, at (360) 236-3250 or by e-mail at michelle.austin@doh.wa.gov

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AMENDATORY SECTION (Amending Order 121, filed 12/27/90, effective 1/31/91)

WAC 246-220-001 Authority. Rules ~~((and regulations))~~ set forth herein are adopted pursuant to the provisions of chapter 70.98 RCW.

AMENDATORY SECTION (Amending Order 121, filed 12/27/90, effective 1/31/91)

WAC 246-220-003 Scope. Except as otherwise specifically provided, these ~~((regulations))~~ rules apply to all persons who receive, possess, use, transfer, own or acquire any source of radiation, provided, however, that nothing in these ~~((regulations))~~ rules shall apply to any person to the extent such person is subject to regulation by the ~~((U.S. Nuclear Regulatory Commission))~~ NRC. *

Note: *Attention is directed to the fact that regulation by the ~~((state))~~ department of source material, by-product material, and special nuclear material in quantities not sufficient to form a critical mass is subject to the provisions of the agreement between the state and the ~~((U.S. Nuclear Regulatory Commission))~~ NRC and to ~~((Part 150 of the commission's regulations-))~~ 10 C.F.R. Part 150((b)).

AMENDATORY SECTION (Amending WSR 11-03-020, filed 1/7/11, effective 2/7/11)

WAC 246-220-010 Definitions, abbreviations, and acronyms. ~~((As used in chapters 246-220 through 246-254 WAC, these terms have the definitions set forth below.))~~ The definitions, abbreviations, and acronyms in this section apply throughout chapters 246-220 through 246-254 WAC unless the context clearly indicates otherwise. Additional definitions used only in a certain chapter will be found in that chapter.

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

(2) **"Accelerator produced material"** means any material made radioactive by exposing it in a particle accelerator.

(3) **"Act"** means nuclear energy and radiation, chapter 70.98 RCW.

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

(5) **"Adult"** means an individual eighteen or more years of age.

(6) **"Agreement state"** means any state with which the ~~((United States Nuclear Regulatory Commission))~~ NRC has entered into an effective agreement under ~~((section 274 b.))~~ subsection 274b of the Atomic Energy Act of 1954, as amended ~~((73 Stat. 689))~~.

(7) **"Airborne radioactive material"** means any radioactive material dispersed in the air in the form of particulates, dusts, fumes, mists, vapors, or gases.

(8) **"Airborne radioactivity area"** means a room, enclosure, or operating area in which airborne radioactive material exists in concentrations (a) in excess of the derived air concentration (DAC) specified in WAC 246-221-290, Appendix A, or (b) to the degree that an in-

dividual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI) or twelve DAC-hours.

(9) "**Air purifying respirator**" means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

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

(11) "**ALI (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 0.05 Sv (5 rem) or a committed dose equivalent of 0.5 Sv (50 rem) to any individual organ or tissue. ALI values for intake by ingestion and by inhalation of selected radionuclides are given in WAC 246-221-290.

(12) "**APF (assigned protection factor)**" ~~((APF))~~ means the expected workplace level of respiratory protection that would be provided by a properly functioning respirator or a class of respirators to properly fitted and trained users. Operationally, the inhaled concentration can be estimated by dividing the ambient airborne concentration by the APF.

(13) "**Atmosphere-supplying respirator**" means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes ~~((supplied-air respirators--))~~ SARs ~~((+))~~ and ~~((self-contained--breathing--apparatus--))~~ SCBA ~~((+))~~ units.

(14) "**Background radiation**" means radiation from cosmic sources; naturally occurring radioactive materials, including radon, except as a decay product of source or special nuclear material, and including global fallout as it exists in the environment from the testing of nuclear explosive devices or from past nuclear accidents such as Chernobyl that contribute to background radiation and are not under the control of the licensee. "Background radiation" does not include sources of radiation from radioactive materials regulated by the department.

(15) "**Bq (becquerel)**" ~~((Bq))~~ means the SI unit of activity. One becquerel is equal to 1 disintegration or transformation per second (s^{-1}).

(16) "**Bioassay**" means the determination of kinds, quantities or concentrations, and, in some cases, the locations of radioactive material in the human body, whether by direct measurement, in vivo counting, or by analysis and evaluation of materials excreted or removed from the human body. For purposes of these ~~((regulations))~~ rules, "radiobioassay" is an equivalent term.

(17) "**By-product material**" means:

(a) Any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident to the process of producing or using special nuclear material;

(b) The tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies de-

pleted by these solution extraction operations do not constitute "by-product material" within this definition;

(c)(i) Any discrete source of radium 226 that is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; or

(ii) Any material that:

(A) Has been made radioactive by use of a (~~particular~~) particle accelerator; and

(B) Is produced, extracted, or converted after extraction, (~~before, on, or after August 8, 2005,~~) for use for a commercial, medical, or research activity; and

(d) Any discrete source of naturally occurring radioactive material, other than source material, that:

(i) The commission, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy, the Secretary of Homeland Security, and the head of any other appropriate federal agency determines would pose a threat similar to the threat posed by a discrete source of radium 226 to the public health and safety or the common defense and security; and

(ii) (~~Before, on, or after August 8, 2005,~~) Is extracted or converted after extraction for use for in a commercial, medical, or research activity.

(18) "**Calendar quarter**" means at least twelve but no more than fourteen consecutive weeks. The first calendar quarter of each year begins in January and subsequent calendar quarters shall be arranged so that no day is included in more than one calendar quarter and no day in any one year is omitted from inclusion within a calendar quarter. A licensee or registrant may not change the method of determining calendar quarters for purposes of these (~~regulations~~) rules.

(19) "**Calibration**" means the determination of (a) the response or reading of an instrument relative to a series of known radiation values over the range of the instrument, or (b) the strength of a source of radiation relative to a standard.

(20) "**C.F.R.**" means Code of Federal Regulations.

(21) "**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 ten days, for Class W, Weeks, from ten to one hundred days, and for Class Y, Years, of greater than one hundred days. For purposes of these (~~regulations~~) rules, "lung class" and "inhalation class" are equivalent terms. For "class of waste" see WAC 246-249-040.

(22) "**Collective dose**" means the sum of the individual doses received in a given period of time by a specified population from exposure to a specified source of radiation.

(23) "**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 fifty-year period following the intake.

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

(25) "**Consortium**" means an association of medical use licensees and a PET radionuclide production facility in the same geographical area that jointly own or share in the operation and maintenance cost

of the PET radionuclide production facility that produces PET radionuclides for use in producing radioactive drugs within the consortium for noncommercial distributions among its associated members for medical use. The PET radionuclide production facility within the consortium must be located at an educational institution or a federal facility or a medical facility.

(26) "**Constraint**" or dose constraint means a value above which specified licensee actions are required.

(27) "**Controlled area.**" See "Restricted area."

(28) "**Curie**" means a unit of quantity of radioactivity. One curie (Ci) is that quantity of radioactive material which decays at the rate of 3.7×10^{10} transformations per second (tps).

(29) "**Declared pregnant woman**" means a woman who has voluntarily informed the licensee or registrant, in writing, of her pregnancy, and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant.

(30) "**Deep dose equivalent**" (H_d), which applies to external whole body exposure, means the dose equivalent at a tissue depth of 1 centimeter (1000 mg/cm^2).

(31) "**Demand respirator**" means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

(32) "**Department**" means the Washington state department of health, which has been designated as the state radiation control agency under chapter 70.98 RCW.

(33) "**Depleted uranium**" means the source material uranium in which the isotope Uranium-235 is less than 0.711 percent by weight of the total uranium present. Depleted uranium does not include special nuclear material.

(34) "**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 two thousand hours under conditions of light work, results in an intake of one ALI. For purposes of these (~~regulations~~) rules, the condition of light work is an inhalation rate of 1.2 cubic meters of air per hour for two thousand hours in a year. DAC values are given in WAC 246-221-290.

(35) "**DAC-hour (derived air concentration-hour)**" (~~(DAC-hour)~~) means 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 or registrant may take two thousand DAC-hours to represent one ALI, equivalent to a committed effective dose equivalent of 0.05 Sv (5 rem).

(36) "**Discrete source**" means a radionuclide that has been processed so that its concentration within a material has been purposely increased for use for commercial, medical or research activities.

(37) "**Disposable respirator**" means a respirator for which maintenance is not intended and that is designed to be discarded after excessive breathing resistance, sorbent exhaustion, physical damage, or end-of-service-life renders it unsuitable for use. Examples of this type of respirator are a disposable half-mask respirator or a disposable escape-only self-contained breathing apparatus (SCBA).

(38) "**Dose**" is a generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, total organ dose equivalent, or to-

tal effective dose equivalent. For purposes of these rules, "radiation dose" is an equivalent term.

(39) **"Dose commitment"** means the total radiation dose to a part of the body that will result from retention in the body of radioactive material. For purposes of estimating the dose commitment, it is assumed that from the time of intake the period of exposure to retained material will not exceed fifty years.

(40) **"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 sievert (Sv) and rem.

(41) **"Dose limits"** means the permissible upper bounds of radiation doses established in accordance with these ~~((regulations))~~ rules. For purposes of these ~~((regulations))~~ rules, "limits" is an equivalent term.

(42) **"Dosimetry processor"** means a person that processes and evaluates individual monitoring devices in order to determine the radiation dose delivered to the monitoring devices.

(43) **"dpm"** means disintegrations per minute. See also "curie."

(44) **"Effective dose equivalent"** (H_E) means the sum of the products of the dose equivalent to each organ or tissue (H_T) and the weighting factor (w_T) applicable to each of the body organs or tissues that are irradiated ($H_E = (\sum w_T H_T)$).

(45) **"Embryo/fetus"** means the developing human organism from conception until the time of birth.

(46) **"Entrance or access point"** means any opening through which an individual or extremity of an individual could gain access to radiation areas or to licensed radioactive materials. This includes entry or exit portals of sufficient size to permit human entry, without respect to their intended use.

(47) **"Exposure"** means (a) being exposed to ionizing radiation or to radioactive material, or (b) the quotient of ~~((AQ))~~ dQ by ~~((Am))~~ dm where ~~((AQ))~~ 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 ~~((Am))~~ dm are completely stopped in air. The special unit of exposure is the roentgen (R) and the SI equivalent is the coulomb per kilogram (C/kg). One roentgen is equal to 2.58×10^{-4} coulomb per kilogram of air.

(48) **"Exposure rate"** means the exposure per unit of time, such as roentgen per minute and milliroentgen per hour.

(49) **"External dose"** means that portion of the dose equivalent received from any source of radiation outside the body.

(50) **"Extremity"** means hand, elbow, arm below the elbow, foot, knee, and leg below the knee.

(51) **"Filtering facepiece"** (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium, not equipped with elastomeric sealing surfaces and adjustable straps.

(52) **"Fit factor"** means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

(53) **"Fit test"** means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

(54) **"Former United States Atomic Energy Commission (AEC) or United States Nuclear Regulatory Commission (NRC) licensed facilities"** means nuclear reactors, nuclear fuel reprocessing plants, uranium enrichment plants, or critical mass experimental facilities where AEC or NRC licenses have been terminated.

(55) **"Generally applicable environmental radiation standards"** means standards issued by the United States 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 boundaries of locations under the control of persons possessing or using radioactive material.

(56) **"Gray"** (Gy) means the SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 joule/kilogram (100 rad).

(57) **"Healing arts"** means the disciplines of medicine, dentistry, osteopathy, chiropractic, podiatry, and veterinary medicine.

(58) **"Helmet"** means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

(59) **"High radiation area"** means any area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 1 mSv (0.1 rem) in one hour at 30 centimeters from any source of radiation or 30 centimeters from any surface that the radiation penetrates. For purposes of these ((regulations)) rules, rooms or areas in which diagnostic X-ray systems are used for healing arts purposes are not considered high radiation areas.

(60) **"Hood"** means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

(61) **"Human use"** means the intentional internal or external administration of radiation or radioactive material to human beings.

(62) **"Immediate"** or **"immediately"** means as soon as possible but no later than four hours after the initiating condition.

(63) **"IND"** means investigatory new drug for which an exemption has been claimed under the United States Food, Drug and Cosmetic Act (Title 21 C.F.R.).

(64) **"Individual"** means any human being.

(65) **"Individual monitoring"** means the assessment of:

(a) Dose equivalent (i) by the use of individual monitoring devices or (ii) by the use of survey data; or

(b) Committed effective dose equivalent (i) by bioassay or (ii) by determination of the time-weighted air concentrations to which an individual has been exposed, that is, DAC-hours.

(66) **"Individual monitoring devices"** (individual monitoring equipment) means devices designed to be worn by a single individual for the assessment of dose equivalent e.g., as film badges, thermoluminescent dosimeters (TLDs), pocket ionization chambers, and personal ("lapel") air sampling devices.

(67) **"Inspection"** means an official examination or observation by the department including but not limited to, tests, surveys, and monitoring to determine compliance with rules, orders, requirements and conditions of the department.

(68) **"Interlock"** means a device arranged or connected so that the occurrence of an event or condition is required before a second event or condition can occur or continue to occur.

(69) **"Internal dose"** means that portion of the dose equivalent received from radioactive material taken into the body.

(70) **"Irretrievable source"** means any sealed source containing licensed material which is pulled off or not connected to the wireline downhole and for which all reasonable effort at recovery, as determined by the department, has been expended.

(71) **"LDE (lens dose equivalent)"** (~~((LDE))~~) 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 centimeters (300 mg/cm²).

(72) **"License"** means a license issued by the department.

(73) **"Licensed material"** means radioactive material received, possessed, used, transferred, or disposed under a general or specific license issued by the department.

(74) **"Licensee"** means any person who is licensed by the department under these rules and the act.

(75) (~~("Licensing state" means any state with regulations equivalent to the suggested state regulations for control of radiation relating to, and an effective program for, the regulatory control of NARM and which has been granted final designation by the Conference of Radiation Control Program Directors, Inc.~~

~~((76))~~) **"Loose-fitting facepiece"** means a respiratory inlet covering that is designed to form a partial seal with the face.

(~~((77))~~) (76) **"Lost or missing licensed material"** means licensed material whose location is unknown. This definition includes licensed material that has been shipped but has not reached its planned destination and whose location cannot be readily traced in the transportation system.

(~~((78))~~) (77) **"Member of the public"** means an individual except when the individual is receiving an occupational dose.

(~~((79))~~) (78) **"Minor"** means an individual less than eighteen years of age.

(~~((80))~~) (79) **"Monitoring"** means the measurement of radiation, radioactive material concentrations, surface area activities or quantities of radioactive material and the use of the results of these measurements to evaluate potential exposures and doses. For purposes of these (~~regulations~~) rules, radiation monitoring and radiation protection monitoring are equivalent terms.

(~~((81))~~) (80) **"NARM"** means any naturally occurring or accelerator-produced radioactive material. It does not include by-product, source, or special nuclear material. (~~For the purpose of meeting the definition of a licensing state by the Conference of Radiation Control Program Directors, Inc. (CRCPD), NARM refers only to discrete sources of NARM. Diffuse sources of NARM are excluded from consideration by the CRCPD for Licensing State designation purposes.~~

~~((82))~~) (81) **"Nationally tracked source"** means a sealed source containing a quantity equal to or greater than Category 1 or Category 2 levels of any radioactive material listed in WAC 246-221-236. In this context a sealed source is defined as radioactive material that is sealed in a capsule or closely bonded, in a solid form and which is not exempt from regulatory control. It does not mean material encapsulated solely for disposal, or nuclear material contained in any fuel assembly, subassembly, fuel rod, or fuel pellet. Category 1 nationally tracked sources are those containing radioactive material at a quantity equal to or greater than the Category 1 threshold. Category 2 nationally tracked sources are those containing radioactive material at a quantity equal to or greater than the Category 2 threshold but less than the Category 1 threshold.

((+83+)) (82) **"Natural radioactivity"** means radioactivity of naturally occurring nuclides.

((+84+)) (83) **"NDA"** means a new drug application which has been submitted to the United States Food and Drug Administration.

((+85+)) (84) **"Negative pressure respirator"** (tight-fitting) means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

((+86+)) (85) **"Nonstochastic 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. For purposes of these rules, a "deterministic effect" is an equivalent term.

((+87+)) ~~"Nuclear Regulatory Commission" (NRC))~~ (86) **"NRC"** means the ((United States)) U.S. Nuclear Regulatory Commission ((or its duly authorized representatives)).

((+88+)) (87) **"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 or to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee, registrant, or other person. Occupational dose does not include dose received: From background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released under chapter 246-240 WAC, from voluntary participation in medical research programs, or as a member of the public.

((+89+)) (88) **"Ore refineries"** means all processors of a radioactive material ore.

((+90+)) (89) **"Particle accelerator"** means any machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium at energies usually in excess of 1 MeV. For purposes of this definition, "accelerator" is an equivalent term.

((+91+)) (90) **"Permittee"** means a person who has applied for, and received, a valid site use permit for use of the low-level waste disposal facility at Hanford, Washington.

((+92+)) (91) **"Person"** means any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, ((agency, political subdivision of this state, any other state or political subdivision or agency thereof,)) and any legal successor, representative, agent or agency of the foregoing((, but shall not include federal government agencies)).

((+93+)) (92) **"Personal supervision"** means supervision where the supervisor is physically present at the facility and in sufficient proximity that contact can be maintained and immediate assistance given as required.

((+94+)) (93) **"Personnel monitoring equipment."** See individual monitoring devices.

((+95+)) (94) **"PET"** means positron emission tomography.

((+96+)) (95) **"Pharmacist"** means an individual licensed by this state to compound and dispense drugs, and poisons.

((+97+)) (96) **"Physician"** means a medical doctor or doctor of osteopathy licensed by this state to prescribe and dispense drugs in the practice of medicine.

((+98+)) (97) **"Planned special exposure"** means an infrequent exposure to radiation, separate from and in addition to the annual occupational dose limits.

((+99+)) (98) **"Positive pressure respirator"** means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

((+100+)) (99) **"PAPR (powered air-purifying respirator)"** ((+PAPR+)) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

((+101+)) (100) **"Practitioner"** means an individual licensed by the state ((in)) for the practice of a healing art (i.e., physician, dentist, podiatrist, chiropractor, etc.).

((+102+)) (101) **"Pressure demand respirator"** means a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

((+103+)) (102) **"Public dose"** means the dose received by a member of the public from exposure to sources of radiation under the licensee's or registrant's control or to radiation or radioactive material released by the licensee. Public dose does not include occupational dose or doses received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released under chapter 246-240 WAC, or from voluntary participation in medical research programs.

((+104+)) (103) **"Qualified expert"** means an individual who has demonstrated to the satisfaction of the department ((he/she has)) the knowledge, training, and experience to measure ionizing radiation, to evaluate safety techniques, and to advise regarding radiation protection needs. The department reserves the right to recognize the qualifications of an individual in specific areas of radiation protection.

((+105+)) (104) **"QLFT (qualitative fit test)"** ((+QLFT+)) means a pass/fail fit test to assess the adequacy of respirator fit ((that)) which relies on the individual's response to the test agent.

((+106+)) (105) **"Quality factor"** (Q) means the modifying factor, listed in Tables I and II, that is used to derive dose equivalent from absorbed dose.

TABLE I
QUALITY FACTORS AND ABSORBED DOSE EQUIVALENCIES

TYPE OF RADIATION	Quality Factor (Q)	Absorbed Dose Equal to A Unit Dose Equivalent ^a
X, gamma, or beta radiation and high-speed electrons	1	1
Alpha particles, multiple-charged particles, fission fragments and heavy particles of unknown charge	20	0.05
Neutrons of unknown energy	10	0.1
High-energy protons	10	0.1

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

If it is more convenient to measure the neutron fluence rate rather than to determine the neutron dose equivalent rate in sievert per hour or rem per hour as required for Table I, then 0.01 Sv (1 rem) of neutron radiation of unknown energies may, for purposes of these ((regulations)) rules, be assumed to result from a total fluence of 25 million neutrons per square centimeter incident upon the body. If sufficient information exists to estimate the approximate energy distribution of the neutrons, the licensee or registrant may use the fluence

rate per unit dose equivalent or the appropriate Q value from Table II to convert a measured tissue dose in gray or rad to dose equivalent in sievert or rem.

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

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

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

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

~~((107))~~ (106) **"QNFT (quantitative fit test)"** ~~((QNFT))~~ means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

~~((108))~~ (107) **"Quarter"** means a period of time equal to one-fourth of the year observed by the licensee, approximately thirteen consecutive weeks, providing that the beginning of the first quarter in a year coincides with the starting date of the year and that no day is omitted or duplicated in consecutive quarters.

~~((109))~~ (108) **"Rad"** means the special unit of absorbed dose. One rad equals one-hundredth of a joule per kilogram of material; for example, if tissue is the material of interest, then 1 rad equals 100 ergs per gram of tissue. One rad is equal to an absorbed dose of 100 erg/gram or 0.01 joule/kilogram (0.01 gray).

~~((110))~~ (109) **"Radiation"** means alpha particles, beta particles, gamma rays, X rays, neutrons, high-speed electrons, high-speed protons, and other particles capable of producing ions. For purposes of these ~~((regulations,))~~ rules: Radiation does not include magnetic fields or nonionizing radiation, such as radiowaves or microwaves,

visible, infrared, or ultraviolet light; and ionizing radiation is an equivalent term. (~~Radiation, as used in these regulations, does not include magnetic fields or nonionizing radiation, like radiowaves or microwaves, visible, infrared, or ultraviolet light.~~

~~((111))~~ (110) "**Radiation area**" means any area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.05 mSv (0.005 rem) in one hour at thirty centimeters from the source of radiation or from any surface that the radiation penetrates.

~~((112))~~ (111) "**Radiation machine**" means any device capable of producing ionizing radiation except those devices with radioactive material(~~s~~) as the only source of radiation.

~~((113))~~ (112) "**Radiation safety officer**" means an individual who has the knowledge and responsibility to apply appropriate radiation protection (~~regulations~~) rules and has been assigned that responsibility by the licensee or registrant.

~~((114))~~ (113) "**Radiation source.**" See "Source of radiation."

~~((115))~~ (114) "**Radioactive material**" means any material (solid, liquid, or gas) which emits radiation spontaneously.

~~((116))~~ (115) "**Radioactive waste**" means any radioactive material which is no longer of use and intended for disposal or treatment for the purposes of disposal.

~~((117))~~ (116) "**Radioactivity**" means the transformation of unstable atomic nuclei by the emission of radiation.

~~((118))~~ (117) "**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.

~~((119))~~ (118) "**Registrable item**" means any (~~radiation~~) radiation-producing machine except those exempted by RCW 70.98.180 or exempted by the department under the authority of RCW 70.98.080.

~~((120))~~ (119) "**Registrant**" means any person who is registered by the department or is legally obligated to register with the department in accordance with these rules and the act.

~~((121))~~ (120) "**Registration**" means registration with the department in accordance with the (~~regulations~~) rules adopted by the department.

~~((122))~~ (121) "**Regulations of the United States Department of Transportation**" means the regulations in 49 C.F.R. Parts 170-189, 14 C.F.R. Part 103, and 46 C.F.R. Part 146.

~~((123))~~ (122) "**Rem**" means the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor (1 rem = 0.01 Sv).

~~((124))~~ (123) "**Research and development**" means: (a) Theoretical analysis, exploration, or experimentation; or (b) the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials, and processes. Research and development does not include the internal or external administration of radiation or radioactive material to human beings.

~~((125))~~ (124) "**Respiratory protective equipment**" means an apparatus, such as a respirator, used to reduce an individual's intake of airborne radioactive materials.

((+126+)) (125) "**Restricted area**" means any area to which access is limited by the licensee or registrant for purposes of protecting individuals against undue risks from exposure to radiation and radioactive material. "Restricted area" does not include any areas used for residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area.

((+127+)) (126) "**Roentgen**" (R) means the special unit of exposure. One roentgen equals 2.58×10^{-4} coulombs/kilogram of air.

((+128+)) (127) "**Sanitary sewerage**" means a system of public sewers for carrying off waste water and refuse, but excluding sewage treatment facilities, septic tanks, and leach fields owned or operated by the licensee or registrant.

((+129+)) (128) "**Sealed source**" means any radioactive material that is encased in a capsule designed to prevent leakage or the escape of the radioactive material.

((+130+)) (129) "**SCBA (self-contained breathing apparatus)**" ((+SCBA+)) means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

((+131+)) (130) "**Shallow dose equivalent**" (H_s), which applies to the external exposure of the skin of the whole body or the skin of an extremity, means the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm^2).

((+132+)) (131) "**SI**" means an abbreviation of the International System of Units.

((+133+)) (132) "**Sievert**" means the SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sievert is equal to the absorbed dose in gray multiplied by the quality factor ($1 \text{ Sv} = 100 \text{ rem}$).

((+134+)) (133) "**Site area emergency**" means events which may occur, are in progress, or have occurred that could lead to a significant release of radioactive material and that could require a response by ((+offsite+)) off-site response organizations to protect persons ((+offsite+)) off-site.

((+135+)) (134) "**Site boundary**" means that line beyond which the land or property is not owned, leased, or otherwise controlled by the licensee or registrant.

((+136+)) (135) "**Source container**" means a device in which radioactive material is transported or stored.

((+137+)) (136) "**Source material**" means: (a) Uranium or thorium, or any combination thereof, in any physical or chemical form, or (b) ores which contain by weight one-twentieth of one percent (0.05 percent) or more of ((+i+)) uranium, ((+ii+)) thorium, or ((+iii+)) any combination thereof. Source material does not include special nuclear material.

((+138+)) (137) "**Source material milling**" means the extraction or concentration of uranium or thorium from any ore processing primarily for its source material content.

((+139+)) (138) "**Source of radiation**" means any radioactive material, or any device or equipment emitting or capable of producing ionizing radiation.

((+140+)) (139) "**Special nuclear material**" means:

(a) Plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, and any other material that the ((+United States Nuclear Regulatory Commission+)) NRC, under the provisions of section 51 of the Atomic Energy Act of 1954, as amended, determines to be special nuclear material, but does not include source material; or

(b) Any material artificially enriched in any of the foregoing, but does not include source material.

~~((141))~~ (140) **"Special nuclear material in quantities not sufficient to form a critical mass"** means uranium enriched in the isotope U-235 in quantities not exceeding three hundred fifty grams of contained U-235; uranium-233 in quantities not exceeding two hundred grams; plutonium in quantities not exceeding two hundred grams; or any combination of them in accordance with the following formula: For each kind of special nuclear material, determine the ratio between the quantity of that special nuclear material and the quantity specified above for the same kind of special nuclear material. The sum of the ratios for all of the kinds of special nuclear material in combination shall not exceed "1" (i.e., unity). For example, the following quantities in combination would not exceed the limitation and are within the formula:

$$\begin{array}{r} \frac{175 \text{ (grams contained U-235)}}{350} \quad + \\ \frac{50 \text{ (grams U-233)}}{200} \quad + \\ \frac{50 \text{ (grams Pu)}}{200} \quad < 1 \end{array}$$

~~((142))~~ (141) **"Stochastic 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 linear function of dose without threshold. Hereditary effects and cancer incidence are examples of stochastic effects. For purposes of these ~~((regulations))~~ rules, probabilistic effect is an equivalent term.

~~((143))~~ (142) **"SAR (supplied-air respirator)"** ~~((SAR))~~ or "airline respirator" means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

~~((144))~~ (143) **"Survey"** means an evaluation of the radiological conditions and potential hazards incident to the production, use, release, disposal, or presence of sources of radiation. When appropriate, the evaluation includes, but is not limited to, tests, physical examinations, calculations and measurements of levels of radiation or concentration of radioactive material present.

~~((145))~~ (144) **"Test"** means (a) the process of verifying compliance with an applicable ~~((regulation))~~ rule, or (b) a method for determining the characteristics or condition of sources of radiation or components thereof.

~~((146))~~ (145) **"These rules"** mean all parts of the rules for radiation protection of the state of Washington.

~~((147))~~ (146) **"Tight-fitting facepiece"** means a respiratory inlet covering that forms a complete seal with the face.

~~((148))~~ (147) **"TEDE (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.

~~((149))~~ (148) **"TODE (total organ dose equivalent)"** ~~((TODE))~~ means the sum of the deep dose equivalent and the committed dose equivalent to the organ or tissue receiving the highest dose.

~~((150))~~ (149) **"United States Department of Energy"** means the Department of Energy established by Public Law 95-91, August 4, 1977,

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

((+151+)) (150) **"Unrefined and unprocessed ore"** means ore in its natural form prior to any processing, such as grinding, roasting, beneficiating, or refining.

((+152+)) (151) **"Unrestricted area"** (uncontrolled area) means any area which is not a restricted area. Areas where the external dose exceeds 2 mrem in any one hour or where the public dose, taking into account occupancy factors, will exceed 100 mrem total effective dose equivalent in any one year must be restricted.

((+153+)) (152) **"User seal check"** (fit check) means an action conducted by the respirator user to determine if the respirator is properly seated to the face. Examples include negative pressure check, positive pressure check, irritant smoke check, or isoamyl acetate check.

((+154+)) (153) **"Very high radiation area"** means an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 5 Gy (500 rad) in one hour at one meter from a source of radiation or one meter from any surface that the radiation penetrates.

((+155+)) (154) **"Waste"** means those low-level radioactive wastes containing source, special nuclear or by-product material that are acceptable for disposal in a land disposal facility. For purposes of this definition, low-level radioactive waste means radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or by-product material as defined in subsection (17)(b), (c), and (d) of the definition of by-product material in this section.

((+156+)) (155) **"Waste handling licensees"** mean persons licensed to receive and store radioactive wastes prior to disposal ((and/or) or persons licensed to dispose of radioactive waste.

((+157+)) (156) **"Week"** means seven consecutive days starting on Sunday.

((+158+)) (157) **"Weighting factor"** w_T for an organ or tissue (T) means 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
<hr/>	
Whole Body	1.00 ^b

- ^a 0.30 results form 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.

~~((159))~~ (158) **"Whole body"** means, for purposes of external exposure, head, trunk including male gonads, arms above the elbow, or legs above the knee.

~~((160))~~ (159) **"Worker"** means an individual engaged in activities under a license or registration issued by the department and controlled by a licensee or registrant but does not include the licensee or registrant. Where the licensee or registrant is an individual rather than one of the other legal entities defined under "person," the radiation exposure limits for the worker also apply to the individual who is the licensee or registrant. If students of age eighteen years or older are subjected routinely to work involving radiation, then the students are considered to be workers. Individuals of less than eighteen years of age shall meet the requirements of WAC 246-221-050.

~~((161))~~ (160) **"WL (working level)"** ~~((WL))~~ means any combination of short-lived radon daughters in 1 liter of air that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha particle energy. The short-lived radon daughters are – for radon-222: Polonium-218, lead-214, bismuth-214, and polonium-214; and for radon-220: Polonium-216, lead-212, bismuth-212, and polonium-212.

~~((162))~~ (161) **"WLM (working level month)"** ~~((WLM))~~ means an exposure to one working level for one hundred seventy hours – two thousand working hours per year divided by twelve months per year is approximately equal to one hundred seventy hours per month.

~~((163))~~ (162) **"Year"** means the period of time beginning in January used to determine compliance with the provisions of these ~~((regulations))~~ rules. The licensee or registrant may change the starting date of the year used to determine compliance by the licensee or registrant provided that the change is made at the beginning of the year and that no day is omitted or duplicated in consecutive years.

AMENDATORY SECTION (Amending Order 121, filed 12/27/90, effective 1/31/91)

WAC 246-220-020 Records. (1) Each licensee or registrant shall maintain records relating to the receipt, use, storage, transfer, or disposal of radiation sources, and such other records as the department may require which will permit the determination of the extent of occupational and public exposure from such radiation sources. Copies of these records shall be submitted to the department on request. These requirements are subject to such exemptions as may be provided by department rules.

(2) In accordance with the Public Disclosure Act, the department shall make available to each licensee ~~((and/))~~ or registrant departmen-

tal records pertaining to that licensee or registrant, ~~((at his/her))~~ upon written request.

AMENDATORY SECTION (Amending Order 121, filed 12/27/90, effective 1/31/91)

WAC 246-220-030 Inspections. (1) Each licensee ~~((and/))~~ or registrant shall afford the department at all reasonable times opportunity to inspect sources of radiation and the premises and facilities wherein such sources of radiation are used or stored.

(2) Each licensee ~~((and/))~~ or registrant shall make available to the department for inspection, upon reasonable notice, records maintained pursuant to these ~~((regulations))~~ rules.

(3) In accordance with the Public Disclosure Act, the department shall make available to each licensee ~~((and/))~~ or registrant a copy of every inspection report written which covers any inspection of the licensee's ~~((and/))~~ or registrant's source of radiation, records, premises, or facilities. Copies of these inspection records shall be submitted to the licensee or registrant by the department upon ~~((the))~~ receipt of the written request of the licensee ~~((and/))~~ or registrant.

(4) Any person who resists, impedes, or in any manner interferes with ~~((r))~~ any individual who performs inspections which are related to any activity or facility registration/license issued by the department is subject to immediate license ~~((and/))~~ or registration certificate revocation as well as applicable civil and criminal penalties.

AMENDATORY SECTION (Amending Order 121, filed 12/27/90, effective 1/31/91)

WAC 246-220-040 Tests and surveys. (1) Each licensee and registrant shall perform upon instructions from the department, or shall permit the department to perform, such reasonable tests and surveys as the department deems appropriate or necessary including, but not limited to, tests and surveys of:

- (a) Sources of radiation;
- (b) Facilities wherein sources of radiation are used or stored;
- (c) Radiation detection and monitoring instruments; and
- (d) Other equipment and devices used in connection with utilization or storage of licensed or registered sources of radiation.

(2) In accordance with the Public Disclosure Act, the department shall provide to the licensee ~~((and/))~~ or registrant copies of all tests and surveys conducted on the licensee's ~~((and/))~~ or registrant's sources of radiation, upon written request of the licensee ~~((and/))~~ or registrant. The department shall acknowledge the receipt of the request in a timely manner by telephone or letter.

AMENDATORY SECTION (Amending Order 184, filed 7/24/91, effective 8/24/91)

WAC 246-220-050 Exemptions. (1) The department may, upon application (~~therefor~~) or upon its own initiative, grant such exemptions or exceptions from the requirements of these (~~regulations~~) rules as it determines are authorized by law and will not result in undue hazard to public health and safety or property.

(2) Any U.S. Department of Energy contractor or subcontractor and any (~~U.S. Nuclear Regulatory Commission~~) NRC contractor or subcontractor of the following categories operating within this state is exempt from these (~~regulations~~) rules to the extent that such contractor or subcontractor under the applicable contract receives, possesses, uses, transfers or acquires sources of radiation:

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

(b) Prime contractors of the Department of Energy performing research in, or development, manufacture, storage, testing or transportation of, atomic weapons or components thereof;

(c) Prime contractors of the Department of Energy using or operating nuclear reactors or other nuclear devices in a United States government-owned vehicle or vessel; and

(d) Any other prime contractor or subcontractor of the Department of Energy or (~~of~~) the (~~Nuclear Regulatory Commission~~) NRC when the state and the (~~Nuclear Regulatory Commission~~) NRC 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 the public health and safety.

AMENDATORY SECTION (Amending WSR 94-01-073, filed 12/9/93, effective 1/9/94)

WAC 246-220-090 Communications. All communications and reports concerning these (~~regulations~~) rules, and applications filed thereunder, should be addressed to the Department of Health, (~~Division~~) Office of Radiation Protection, P.O. Box 47827, Olympia, Washington 98504-7827. The emergency telephone number (~~in Seattle,~~) is 206-682-5327 or 206 (NUCLEAR).

AMENDATORY SECTION (Amending Order 121, filed 12/27/90, effective 1/31/91)

WAC 246-220-100 Additional requirements. The department may, by rule(~~, regulation,~~) or order, impose upon any licensee or registrant such requirements in addition to those established in these (~~regula-~~

tions)) rules as it deems appropriate or necessary to minimize danger to public health and safety or property.

AMENDATORY SECTION (Amending WSR 04-23-093, filed 11/17/04, effective 12/18/04)

WAC 246-221-010 Occupational dose limits for adults. (1) The licensee or registrant shall control the occupational dose to individual adults, except for planned special exposures pursuant to WAC 246-221-030, to the following dose limits:

(a) An annual limit, which is the more limiting of:

(i) The total effective dose equivalent being equal to 0.05 Sv (5 rem); or

(ii) The sum of the (~~deep~~) effective dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 0.50 Sv (50 rem).

(b) The annual limits to the lens of the eye, to the skin of the whole body, and to the skin of the extremities which are:

(i) A lens dose equivalent of 0.15 Sv (15 rem); and

(ii) A shallow dose equivalent of 0.50 Sv (50 rem) to the skin of the whole body or to the skin of any extremity.

(2) Doses received in excess of the annual limits, including doses received during accidents, emergencies, and planned special exposures, must be subtracted from the limits specified in WAC 246-221-030 for planned special exposures that the individual may receive during the current year and during the individual's lifetime.

(3) (~~The assigned deep dose equivalent shall be for the portion~~) When the external exposure is determined by measurement with an external personal monitoring device, the deep-dose equivalent must be used in place of the effective dose equivalent, unless the effective dose equivalent is determined by a dosimetry method approved by the NRC or the department. The assigned deep-dose equivalent must be for the part of the body receiving the highest exposure. The assigned shallow dose equivalent shall be the dose averaged over the contiguous ten square centimeters of skin receiving the highest exposure. The deep dose equivalent, lens dose equivalent, and shallow dose equivalent may be assessed from surveys or other radiation measurements for the purpose of demonstrating compliance with the occupational dose limits, if the individual monitoring device was not in the region of highest potential exposure, or the results of the individual monitoring are unavailable.

(4) Derived air concentration (DAC) and annual limit on intake (ALI) values are specified in WAC 246-221-290 and may be used to determine the individual's dose and to demonstrate compliance with the occupational dose limits.

(5) Notwithstanding the annual dose limits, the licensee shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity.

(6) The licensee or registrant shall reduce the dose that an

individual may be allowed to receive in the current year by the amount of occupational dose received while employed by any other person during the current year as determined in accordance with WAC 246-221-020.

AMENDATORY SECTION (Amending WSR 94-01-073, filed 12/9/93, effective 1/9/94)

WAC 246-221-040 Determination of internal exposure of individuals to concentrations of radioactive materials in restricted areas. (1) For purposes of assessing dose used to determine compliance with occupational dose equivalent limits, the licensee shall, when required under WAC 246-221-100, take suitable and timely measurements of:

(a) Concentrations of radioactive materials in air in work areas; or

(b) Quantities of radionuclides in the body; or

(c) Quantities of radionuclides excreted from the body; or

(d) Combinations of these measurements.

(2) Unless respiratory protective equipment is used, as provided in WAC 246-221-117, or the assessment of intake is based on bioassays, the licensee shall assume that an individual inhales radioactive material at the airborne concentration in which the individual is present.

(3) When specific information on the physical and biochemical properties of the radionuclides taken into the body or the behavior of the material in an individual is known, the licensee may:

(a) Use that information to calculate the committed effective dose equivalent, and, if used, the licensee shall document that information in the individual's record; and

(b) Upon prior approval of the department, adjust the DAC or ALI values to reflect the actual physical and chemical characteristics of airborne radioactive material, for example, aerosol size distribution or density; and

(c) Separately assess the contribution of fractional intakes of Class D, W, or Y compounds of a given radionuclide to the committed effective dose equivalent. See WAC 246-221-290.

(4) If the licensee chooses to assess intakes of Class Y material using the measurements given in subsection (1)(b) or (c) of this section, the licensee may delay the recording and reporting of the assessments for periods up to seven months, unless otherwise required by WAC 246-221-250 or 246-221-260. This delay permits the licensee to make additional measurements basic to the assessments.

(5) If the identity and concentration of each radionuclide in a mixture are known, the fraction of the DAC applicable to the mixture for use in calculating DAC-hours shall be either:

(a) The sum of the ratios of the concentration to the appropriate DAC value, that is, D, W, or Y, from WAC 246-221-290

for each radionuclide in the mixture; or

(b) The ratio of the total concentration for all radionuclides in the mixture to the most restrictive DAC value for any radionuclide in the mixture.

(6) If the identity of each radionuclide in a mixture is known, but the concentration of one or more of the radionuclides in the mixture is not known, the DAC for the mixture shall be the most restrictive DAC of any radionuclide in the mixture.

(7) When a mixture of radionuclides in air exists, a licensee may disregard certain radionuclides in the mixture if:

(a) The licensee uses the total activity of the mixture in demonstrating compliance with the dose limits in WAC 246-221-010 and in complying with the monitoring requirements in WAC 246-221-100; and

(b) The concentration of any radionuclide disregarded is less than ten percent of its DAC; and

(c) The sum of these percentages for all of the radionuclides disregarded in the mixture does not exceed thirty percent.

(8) When determining the committed effective dose equivalent, the following information may be considered:

(a) In order to calculate the committed effective dose equivalent, the licensee may assume that the inhalation of one ALI, or an exposure of 2,000 DAC-hours, results in a committed effective dose equivalent of 0.05 Sv (5 rem) for radionuclides that have their ALIs or DACs based on the committed effective dose equivalent.

(b) For an ALI and the associated DAC determined by the nonstochastic organ dose limit of 0.50 Sv (50 rem), the intake of radionuclides that would result in a committed effective dose equivalent of 0.05 Sv (5 rem), that is, the stochastic ALI, is listed in parentheses in Table I of WAC 246-221-290. The licensee may, as a simplifying assumption, use the stochastic ALIs to determine committed effective dose equivalent. However, if the licensee uses the stochastic ALIs, the licensee shall also demonstrate that the limit in WAC 246-221-010 (1)(a)(ii) is met.

AMENDATORY SECTION (Amending WSR 06-05-019, filed 2/6/06, effective 3/9/06)

WAC 246-221-060 Dose limits for individual members of the public. (1) Each licensee or registrant shall conduct operations so that:

(a) The total effective dose equivalent to individual members of the public from the licensed or registered operation does not exceed 1 mSv (0.1 rem) 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 under

chapter 246-240 WAC, from voluntary participation in medical research programs, and from the licensee's or registrant's disposal of radioactive material into sanitary sewerage in accordance with WAC 246-221-190; and

(b) The dose in any unrestricted area from external sources, exclusive of the dose contributions from patients administered radioactive material and released under chapter 246-240 WAC, does not exceed 0.02 mSv (0.002 rem) in any one hour.

(2) If the licensee or registrant permits members of the public to have access to restricted areas, they shall be escorted and the limits for members of the public continue to apply to those individuals.

(3) Notwithstanding subsection (1) of this section, a licensee or registrant may continue to operate a facility constructed and put into operation prior to January 1, 1994, where the annual dose limit for an individual member of the public is more than 1 mSv (0.1 rem) and less than 5 mSv (0.5 rem) total effective dose equivalent, if:

(a) The facility's approved operating conditions for each radiation source remain the same. Any increase in the following operating conditions shall require reevaluation by the department and ~~((or))~~ modification of the facility shielding applicable to the source of radiation to meet the 1 mSv (0.1 rem) total effective dose equivalent limit for individual members of the public: Size of the radiation source, workload, or occupancy factors associated with the source of radiation; and

(b) Any change in the permanent shielding of the facility due to remodeling, repair or replacement requires the facility to meet the 1 mSv (0.1 rem) total effective dose equivalent limit for individual members of the public for areas affected by that portion of the shielding.

(4) Each licensee or registrant shall maintain records sufficient to demonstrate compliance with the dose limit for individual members of the public.

AMENDATORY SECTION (Amending WSR 94-01-073, filed 12/9/93, effective 1/9/94)

WAC 246-221-080 Leak tests. (1) Each sealed radioactive source possessed under the provisions of a specific license, other than hydrogen-3 (tritium), with a half-life greater than thirty days and in any form other than gas, shall be tested and results obtained for leakage ~~((and/))~~ or contamination prior to initial use and at six-month intervals or as specified by the license, except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months. If at any other time there is reason to suspect that a sealed source might have been damaged, it shall be tested for leakage and results obtained before further use. In the absence of a

certificate from a transferor indicating that a test for leakage has been made within six months prior to the transfer (three months for a source designed to emit alpha particles), the sealed source shall not be put into use until tested and the results received.

(2) Leak tests shall be capable of detecting the presence of 185 Bq (0.005 microcurie) of removable contamination. The results of leak tests made pursuant to subsection (1) of this section shall be recorded in units of becquerel or microcuries and shall be maintained for inspection by the department. Any test conducted pursuant to subsection (1) of this section which reveals the presence of 185 Bq (0.005 microcurie) or more of removable contamination shall be considered evidence that the sealed source is leaking. The licensee shall immediately withdraw the source from use shall take action to prevent the spread of contamination and shall cause it to be decontaminated and repaired or to be disposed in accordance with WAC 246-232-080. If a sealed source shows evidence of leaking, a report shall be filed with the department within five days of the test, describing the equipment involved, the test results, and the corrective action taken.

(3) Test samples shall be taken from the sealed source or from the internal surfaces or the opening of the container in which the sealed source is stored or from surfaces of devices or equipment in which the sealed source is permanently mounted. Tests for contamination and leakage may be made by wiping appropriate accessible surfaces on which one might expect contamination to accumulate and measuring these wipes for transferred contamination. Test samples shall also be taken from the interior surfaces of the container in which a sealed source of radium is stored.

(4) Leak tests are required for sealed radioactive sources that are greater than 3.7 MBq (100 microcuries) for beta and gamma emitting sources and greater than 370 KBq (10 microcuries) for sources designed to emit alpha particles.

(5) Tests for leakage or contamination shall be performed by persons specifically authorized by the department, an agreement state, (~~(a licensing state,)~~) or the (~~(United States Nuclear Regulatory Commission)~~) NRC to perform such services.

AMENDATORY SECTION (Amending WSR 01-05-110, filed 2/21/01, effective 3/24/01)

WAC 246-221-110 Surveys. (1) Each licensee or registrant shall make or cause to be made such surveys, as defined in WAC 246-220-010, as may be necessary for the licensee or registrant to establish compliance with these regulations and are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, concentrations or quantities of radioactive material, and potential radiation hazards. Records of such surveys shall be preserved as specified in WAC 246-221-230. Information on performing surveys may be found in the (~~(United States Nuclear~~

~~Regulatory Commission's~~) NRC's Regulatory Guide 8.23 "Radiation Safety Surveys at Medical Institutions."

(2) The licensee shall ensure that instruments and equipment used for quantitative radiation measurements, for example, dose rate and effluent monitoring, are calibrated annually at intervals not to exceed thirteen months for the radiation measured.

AMENDATORY SECTION (Amending WSR 99-15-105, filed 7/21/99, effective 8/21/99)

WAC 246-221-160 Procedures for picking up, receiving, and opening packages. (1) ~~((a))~~ Each licensee who expects to receive a package containing quantities of radioactive material in excess of the Type A₁ or A₂ quantities specified in WAC 246-231-200 shall make arrangements to receive:

~~((i))~~ (a) The package when it is offered for delivery by the carrier; or

~~((ii))~~ (b) Immediate notification from the carrier of the arrival of the package at the carrier's terminal.

~~((b))~~ (2) Each licensee who picks up a package of radioactive material from a carrier's terminal shall pick up the package expeditiously upon receipt of notification from the carrier of its arrival.

~~((2))~~ (3) Each licensee shall:

(a) Monitor for radioactive contamination the external surfaces of any package labeled with a Radioactive White I, Yellow II or Yellow III label unless the package contains only radioactive material in the form of gas or in special form as defined in WAC 246-231-010; and

(b) Monitor the radiation levels of the external surfaces of any package labeled with a Radioactive White I, Yellow II or Yellow III label unless the package contains quantities of radioactive material that are less than or equal to the Type A quantity, as defined in WAC 246-231-200; and

(c) Monitor all packages known to contain radioactive material for radioactive contamination and radiation levels if the package has evidence of potential contamination, such as packages that are crushed, wet, or damaged.

~~((3) The)~~ (4) Monitoring shall be performed:

(a) Immediately upon receipt if there is evidence of package degradation or any other evidence of potential contamination or excessive radiation levels; or

(b) As soon as practicable after receipt, but no later than three hours after the package is received at the licensee's facility if received during the licensee's normal working hours, or no later than three hours from the beginning of the next working day if received after normal working hours.

~~((4))~~ (5) The licensee shall immediately notify the final

delivery carrier and, by telephone and telegram, mailgram, or facsimile, the department when:

(a) For normal shipments, removable radioactive surface contamination exceeds either 22 dpm/((~~cm²~~) cm²) for beta-gamma emitting radionuclides, all radionuclides with half-lives less than ten days, natural uranium, natural thorium, uranium-235, uranium-238, thorium-232, and thorium-228 and thorium 230 when contained in ores or concentrates; or 2.2 dpm/((~~cm²~~) cm²) for all other alpha emitting radionuclides; or

(b) For exclusive use shipments, removable radioactive surface contamination exceeds either 220 dpm/((~~cm²~~) cm²) for beta-gamma emitting radionuclides, all radionuclides with half-lives less than ten days, natural uranium, natural thorium, uranium-235, uranium-238, thorium-232, and thorium-228 and thorium 230 when contained in ores or concentrates; or 22 dpm/((~~cm²~~) cm²) for all other alpha emitting radionuclides; or

(c) For normal or exclusive use shipments, external radiation levels exceed two mSv/hour (200 millirem per hour) at any point on the external surface of the package; or

(d) For exclusive use shipments where the shipment is made in a closed transport vehicle, packages are secured in a fixed position, and no loading or unloading occurs between the beginning and end of transportation, external radiation levels exceed ten mSv/hour (1000 millirem per hour) at any point on the external surface of the package.

((~~5~~)) (6) Each licensee shall establish and maintain procedures for safely opening packages in which radioactive material is received, and shall assure that such procedures are followed and that due consideration is given to instructions for the type of package being opened and the monitoring of potentially contaminated packaging material (including packages containing radioactive material in gaseous form) to assure that only background levels of radiation are present prior to disposal of such material as nonradioactive waste.

((~~6~~)) (7) Licensees transferring special form sources to and from a work site in vehicles owned or operated by the licensee are exempt from the contamination monitoring requirements of subsection ((~~2~~)) (3)(a) of this section but are not exempt from the monitoring requirement in subsection ((~~2~~)) (3)(b) of this section for measuring radiation levels to ensure that the source is still properly lodged in its shield.

AMENDATORY SECTION (Amending WSR 94-01-073, filed 12/9/93, effective 1/9/94)

WAC 246-221-220 Disposal of specific wastes. (1) Any licensee may dispose of the following licensed material without regard to its radioactivity:

(a) 1.85 KBq (0.05 microcurie(~~s~~)) or less of hydrogen-3 or

carbon-14, per gram of medium, used for liquid scintillation counting; and

(b) 1.85 KBq (0.05 microcurie(~~(s)~~)) or less of hydrogen-3 or carbon-14, per gram of animal tissue averaged over the weight of the entire animal.

(2) The licensee shall not dispose of tissue under this section in a manner that would permit its use either as food for humans or as animal feed; and

(3) Nothing in this section, however, relieves the licensee of maintaining records showing the receipt, transfer and disposal of such (~~(byproduct)~~) radioactive material as specified in WAC 246-220-020; and

(4) Nothing in this section relieves the licensee from complying with other applicable federal, state and local regulations governing any other toxic or hazardous property of these materials.

AMENDATORY SECTION (Amending WSR 94-01-073, filed 12/9/93, effective 1/9/94)

WAC 246-221-240 Reports of stolen, lost or missing radiation sources. (1) Each licensee and(~~(or)~~) registrant shall report by telephone (206(~~(+)~~)-682-5327) and confirm promptly by letter, telegram, mailgram, or facsimile to the State Department of Health, (~~(Division)~~) Office of Radiation Protection, P.O. Box 47827, Olympia, Washington 98504-7827.

(a) Immediately after its occurrence becomes known to the licensee, stolen, lost, or missing radioactive material in an aggregate quantity equal to or greater than one thousand times the quantity specified in WAC 246-221-300, Appendix B; or

(b) Within thirty days after its occurrence becomes known to the licensee, lost, stolen, or missing radioactive material in an aggregate quantity greater than ten times the quantity specified in (~~(Appendix C)~~) WAC 246-221-300, Appendix B that is still missing or any item not exempted in chapter 246-232 WAC; or

(c) Immediately after its occurrence becomes known to the registrant, a stolen, lost, or missing radiation machine.

(2) Each licensee or registrant required to make a report pursuant to subsection (1) of this section shall, within thirty days after making the telephone report, make a written report to the department setting forth the following information:

(a) A description of the licensed or registered source of radiation involved, including, for radioactive material, the kind, quantity, and chemical and physical form; and, for radiation machines, the manufacturer, model and serial number, type and maximum energy of radiation emitted; and

(b) A description of the circumstances under which the loss or theft occurred; and

(c) A statement of disposition, or probable disposition, of the licensed or registered source of radiation involved; and

(d) Exposures of individuals to radiation, circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas; and

(e) Actions that have been taken, or will be taken, to recover the source of radiation; and

(f) Procedures or measures that have been, or will be, adopted to ensure against a recurrence of the loss or theft of licensed or registered sources of radiation.

(3) Subsequent to filing the written report, the licensee or registrant shall also report additional substantive information on the loss or theft within thirty days after the licensee or registrant learns of such information.

(4) The licensee or registrant shall prepare any report filed with the department pursuant to this section so that names of individuals who may have received exposure to radiation are stated in a separate and detachable portion of the report.

AMENDATORY SECTION (Amending WSR 01-05-110, filed 2/21/01, effective 3/24/01)

WAC 246-221-250 Notification of incidents. (1) **Immediate notification.** Notwithstanding other requirements for notification, each licensee and(~~or~~) registrant shall immediately (as soon as possible but no later than four hours after discovery of an incident) notify the State Department of Health, (~~Division~~) Office of Radiation Protection, P.O. Box 47827, Olympia, Washington 98504-7827, by telephone (206(~~+~~))_682-5327) and confirming letter, telegram, mailgram, or facsimile of any incident involving any radiation source which may have caused or threatens to cause:

(a) An individual to receive:

(i) A total effective dose equivalent of 0.25 Sv (25 rem) or more;

(ii) A lens dose equivalent of 0.75 Sv (75 rem) or more; or

(iii) A shallow dose equivalent to the skin or extremities or a total organ dose equivalent of 2.5 Sv (250 rem) or more;

(b) The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for twenty-four hours, the individual could have received an intake five times the occupational ALI. This provision does not apply to locations where personnel are not normally stationed during routine operations, such as hot-cells or process enclosures; or

(c) The loss of ability to take immediate protective actions necessary to avoid exposure to sources of radiation or releases of radioactive material that could exceed regulatory limits. Events which could cause such a loss of ability include fires, explosions, toxic gas releases, etc.

(2) **Twenty-four hour notification.** Each licensee and (~~for~~) registrant shall within twenty-four hours of discovery of the event, notify the State Department of Health, (~~Division~~) Office of Radiation Protection, P.O. Box 47827, Olympia, Washington 98504-7827, by telephone (206(~~7~~)-682-5327) and confirming letter, telegram, mailgram, or facsimile of any incident involving any radiation source possessed which may have caused or threatens to cause:

(a) An individual to receive, in a period of twenty-four hours:

(i) A total effective dose equivalent exceeding 0.05 Sv (5 rem);

(ii) A lens dose equivalent exceeding 0.15 Sv (15 rem); or

(iii) A shallow dose equivalent to the skin or extremities or a total organ dose equivalent exceeding 0.5 Sv (50 rem);

(b) The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for twenty-four hours, the individual could have received an intake in excess of one occupational ALI. This provision does not apply to locations where personnel are not normally stationed during routine operations, such as hot-cells or process enclosures;

(c) An unplanned contamination incident that:

(i) Requires access to the contaminated area, by workers or the general public, to be restricted for more than twenty-four hours by imposing additional radiological controls or by prohibiting entry into the area;

(ii) Involves a quantity of material greater than five times the lowest annual limit on intake specified in WAC 246-221-290; and

(iii) Has access to the area restricted for a reason other than to allow radionuclides with a half-life of less than twenty-four hours to decay prior to decontamination;

(d) Equipment failure or inability to function as designed when:

(i) The equipment is required by regulation or license condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive material exceeding regulatory limits or to mitigate the consequences of an accident;

(ii) The equipment is required to be available and operable at the time it becomes disabled or fails to function; and

(iii) No redundant equipment is available and operable to perform the required safety functions;

(e) An unplanned medical treatment at a medical facility of an individual with (~~spreadable~~) removable radioactive contamination on the individual's clothing or body; or

(f) An unplanned fire or explosion damaging any radioactive material or any device, container or equipment containing radioactive material when:

(i) The quantity of radioactive material involved is greater than five times the lowest annual limit on intake specified in WAC 246-221-290; and

(ii) The damage affects the integrity of the radioactive material or its container.

(3) For each occurrence requiring notification pursuant to

this section, a prompt investigation of the situation shall be initiated by the licensee/registrant. A written report of the findings of the investigation shall be sent to the department within thirty days.

(4) The licensee or registrant shall prepare each report filed with the department under this section so that names of individuals who have received exposure to sources of radiation are stated in a separate and detachable portion of the report.

Any report filed with the department under this section shall contain the information described in WAC 246-221-260 (2) and (3).

(5) The provisions of this section do not apply to doses that result from planned special exposures, provided such doses are within the limits for planned special exposures and are reported pursuant to WAC 246-221-265.

(6) Telephone notifications that do not involve immediate or twenty-four hour notification should be made to the ((~~Olympia~~) Tumwater office (360-236-3300).

(7) Telephone notification required under this section shall include, to the extent that the information is available at the time of notification:

- (a) The caller's name and call-back telephone number;
- (b) A description of the incident including date and time;
- (c) The exact location of the incident;
- (d) The radionuclides, quantities, and chemical and physical forms of the radioactive materials involved; and
- (e) Any personnel radiation exposure data available.

WAC 246-222-030 Instructions to workers. (1) All individuals likely to receive in a year an occupational dose in excess of 1 mSv (100 mrem):

(a) Shall be kept informed of the storage, transfer, or use of sources of radiation in the licensee's or registrant's facility;

(b) Shall be instructed in the health protection considerations for the individual and potential offspring associated with exposure to radiation or radioactive material, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed;

(c) Shall be instructed in, and instructed to observe, to the extent within the worker's control, the applicable provisions of these regulations, department form RHF-3 "Notice to employees," and license conditions for the protection of personnel from exposure((s)) to radiation or radioactive material;

(d) Shall be instructed that any worker or representative of workers who believes that a violation of the regulations, license conditions, or unnecessary exposure to radiation exists or occurred, may request an inspection by the department by oral or written notification. The notification shall set forth specific grounds for the complaint. Any such notification to the department is confidential;

(e) Shall be instructed of their right to notify the department if the individual suspects improper actions by a licensee/registrant, or conditions which may lead to a violation of these regulations, the license/registration, or unnecessary exposure to radiation or radioactive materials;

(f) Shall be instructed that employment discrimination by a licensee/registrant against an employee because of actions described in this chapter is prohibited;

(g) Shall be instructed as to their responsibility to report promptly to the licensee or registrant any condition which may constitute, lead to, or cause a violation of the act, these regulations, and licenses or unnecessary exposure to radiation or radioactive material;

(h) Shall be instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation or radioactive material; and

(i) Shall be advised as to the radiation exposure reports which workers shall be furnished pursuant to WAC 246-222-040.

(2) Records of these instructions described in subsection (1) of this section for all individuals working in, or frequenting any portion of, a restricted area shall be maintained for inspection by the department until further notice. These records shall include a copy of this section, or all the information contained in this section, along with a dated verification signature by the employee stating that the individual has received an explanation of the instructions contained in this section.

(3) In determining those individuals subject to the requirements of subsection (1) of this section, licensees and registrants shall take into consideration assigned activities during normal and abnormal situations involving exposure to sources of radiation which can reasonably be expected to occur during the life of a licensed or registered facility. The extent of these instructions shall be commensurate

with potential radiological health protection considerations present in the workplace.

AMENDATORY SECTION (Amending WSR 94-01-073, filed 12/9/93, effective 1/9/94)

WAC 246-222-040 Notifications and reports to individuals. (1) Radiation exposure data for an individual and the results of any measurements, analyses, and calculations of radioactive material deposited or retained in the body of an individual shall be reported to the individual as specified in this section. The information reported shall include data and results obtained pursuant to these regulations, orders, and license conditions, as shown in records maintained by the licensee or registrant pursuant to these regulations. Each notification and report shall:

- (a) Be in writing;
- (b) Include appropriate identifying data such as the name of the licensee or registrant, the name of the individual, and the individual's identification number, preferably Social Security number;
- (c) Include the individual's exposure information; and
- (d) Contain the following statement:

"This report is furnished to you under the provisions of the Washington state department of health, (~~division~~) office of radiation protection, rules (~~and regulations~~) for radiation protection. You should preserve this report for further reference."

(2) Each licensee or registrant shall advise each worker annually of the worker's dose as shown in records maintained by the licensee or registrant pursuant to WAC 246-221-090, 246-221-100, and 246-221-230.

(3) At the request of a worker formerly engaged in work controlled by the licensee or the registrant, each licensee or registrant shall furnish to each worker or former worker a report of the worker's dose due to exposure to radiation or radioactive material upon termination. For the purposes of this section, termination means the end of employment with the licensee or the end of a work assignment in the licensee's restricted area(s) in a given calendar quarter without expectation, or specific scheduling, of reentry into such restricted area(s) during the remainder of that calendar quarter. Such report shall be furnished within thirty days from the time the request is made, or within thirty days after the exposure of the individual has been determined by the licensee or registrant, whichever is later; shall cover, within the period of time specified in the request, the dose record for each year in which the worker's activities involved exposure to radiation from radioactive material licensed by, or radiation machines registered with the department; and shall include the dates and locations of work under the license or registration in which the worker participated during this period.

(4) In addition to the requirements of subsection (3) of this section, at the request of a worker who is terminating employment with the licensee or registrant in work involving radiation exposure, during the current year, each licensee or registrant shall provide at termination to each such worker, or to the worker's designee a written report regarding the radiation dose received by that worker from operations of the licensee or registrant during the current year. If the

most recent individual monitoring results are not available at that time, a written estimate of the dose shall be provided together with a clear indication that this is an estimate.

(5) When a licensee or registrant is required pursuant to WAC 246-221-250, 246-221-260, or 246-221-265 to report to the department any exposure of an identified occupationally exposed individual, or an identified member of the public, to radiation or radioactive material, the licensee or the registrant shall also provide the individual a written report on the individual's exposure data included therein. Such reports shall be transmitted at a time not later than the transmittal to the department.

AMENDATORY SECTION (Amending WSR 94-01-073, filed 12/9/93, effective 1/9/94)

WAC 246-222-070 Requests by workers for inspections. (1) Any worker or representative of workers who believes that a violation of the act, of these regulations, or of license conditions exists or has occurred in work under a license or registration with regard to radiological working conditions in which the worker is engaged, may request an inspection by giving notice of the alleged violation to the Washington state department of health, (~~division~~) office of radiation protection. Any such notice shall be in writing, shall set forth the specific grounds for the notice, and shall be signed by the worker or representative of the workers. A copy shall be provided to the licensee or registrant by the office of radiation protection no later than at the time of inspection except that, upon the request of the worker giving such notice, his or her name and the name of individuals referred to therein shall not appear in such copy or on any record published, released, or made available by the department, except for good cause shown.

(2) If, upon receipt of such notice, the inspector for the (~~division~~) office of radiation protection determines that the complaint meets the requirements set forth in subsection (1) of this section, and that there are reasonable grounds to believe that the alleged violation exists or has occurred, the inspector shall cause an inspection to be made as soon as practicable, to determine if such alleged violation exists or has occurred. Inspections pursuant to this section need not be limited to matters referred to in the complaint.

(3) No licensee or registrant shall discharge or in any manner discriminate against any worker because such worker has filed any complaint or instituted or caused to be instituted any proceeding under these regulations or has testified or is about to testify in any such proceeding or because of the exercise by such worker on behalf of the worker or other workers of any option afforded by this chapter.

AMENDATORY SECTION (Amending WSR 98-13-037, filed 6/8/98, effective 7/9/98)

WAC 246-222-080 Inspections not warranted--Informal review. (1) If the department of health, (~~division~~) office of radiation protection

determines, with respect to a complaint under WAC 246-222-070 that an inspection is not warranted because there are no reasonable grounds to believe that a violation exists or has occurred, the ~~((division))~~ office of radiation protection shall notify the complainant in writing of such determination.

(a) If the complaint resulted from activities concerning naturally occurring or accelerator produced radioactive materials ~~((and/))~~ or radiation producing machines: The complainant may obtain review of such determination by submitting a written statement of position to the Assistant Director, Division of Industrial Safety and Health, P.O. Box 4600, Olympia, Washington 98504-4600. Such request for informal review will be processed according to the provisions of WAC 296-350-460 and the provisions of the interagency agreement between the department of labor and industries and the department of health, ~~((division))~~ office of radiation protection, if any.

(b) If the complaint resulted from activities concerning ~~((by-product))~~ radioactive material ~~((, source material, and/or special nuclear material))~~: The complainant may obtain review of such determination by submitting a written statement of position with the Department of Health, ~~((Division))~~ Office of Radiation Protection, P.O. Box 47827, Olympia, Washington 98504-7827 (360-236-3300), who will provide the licensee or registrant with a copy of such statement by certified mail, excluding, at the request of the complainant, the name of the complainant. The licensee or registrant may submit an opposing written statement of position with the department of health, ~~((division))~~ office of radiation protection, who will provide the complainant with a copy of such statement by certified mail. Upon the request of the complainant, the department of health may hold an informal conference in which the complainant and the licensee or registrant may orally present their views. An informal conference may also be held at the request of the licensee or registrant, but disclosure of the identity of the complainant will be made only following receipt of written authorization from the complainant. After considering all written or oral views presented, the department of health shall affirm, modify, or reverse the determination of the ~~((division))~~ office of radiation protection and furnish the complainant and the licensee or registrant a written notification of the decision and the reason(s) ~~((therefor))~~ therefore.

(2) If the ~~((division))~~ office of radiation protection determines that an inspection is not warranted because the requirements of WAC 246-222-070(1) have not been met, it shall notify the complainant in writing of such determination. Such determination shall be without prejudice to the filing of a new complaint meeting the requirements of WAC 246-222-070(1).

AMENDATORY SECTION (Amending WSR 06-05-019, filed 2/6/06, effective 3/9/06)

WAC 246-240-028 Exemptions regarding Type A specific licenses of broad scope. A licensee possessing a Type A specific license of broad scope for medical use, issued under WAC 246-235-090, is exempt from the provisions of:

(1) WAC 246-240-019 regarding the need to file an amendment to the license for medical use of radioactive material, as described in WAC 246-240-501;

(2) WAC 246-240-022(2);

(3) WAC 246-240-022(5) regarding additions to or changes in the areas of use at the addresses identified in the application or on the license;

(4) WAC 246-240-025 (1)(a)((~~7~~

~~5) WAC 246-240-025)) for an authorized user, an authorized nuclear pharmacist, or an authorized medical physicist;~~

((~~6~~)) (5) WAC 246-240-025 (1)(d) regarding additions to or changes in the areas of use identified in the application or on the license where radioactive material is used in accordance with either WAC 246-240-151 or 246-240-157;

((~~7~~)) (6) WAC ((~~246-240-122~~)) 246-240-066.

Compatibility Comments on Washington Proposed Regulations (NRC RATS ID: 2008-1)

State Section		NRC Section	RATS ID	Category	Subject and Comments	Washington's Response
1	WAC 246-220-010(24)	20.1003	n/a	A	<p>Definitions. Committed effective dose equivalent</p> <p>Washington needs to correct the formula symbols in WAC 246-010(24) "Committed effective dose equivalent" to "$H_{E, 50} = \sum W_T H_T, 50$."</p> <p>Washington needs to make the above changes in order to meet the Compatibility Category A designation of 10 CFR 20.1003 Definition <i>Committed effective dose equivalent</i>.</p>	We have fixed the formula symbols in the "Committed effective dose equivalent" definition, page 3 of the PDF.
2	WAC 246-220-010(44)	20.1003	n/a	A	<p>Definitions. Effective dose equivalent</p> <p>Washington needs to correct the formula symbols in WAC 246-010(44) "Effective dose equivalent" to "$H_E = \sum W_T H_T$."</p> <p>Washington needs to make the above changes in order to meet the Compatibility Category A designation of 10 CFR 20.1003 Definition <i>Effective dose equivalent</i>.</p>	We have fixed the formula symbols in the "Effective dose equivalent" definition, page 5 of the PDF.

	State Section	NRC Section	RATS ID	Category	Subject and Comments	Washington's Response
3	WAC 246-220-010(47)	20.1003	n/a	A	<p>Definitions. Exposure</p> <p>Washington has added the definition for "Exposure" found in the Suggested State Regulations. However several of the mathematical expressions have incorrect symbols. The definition of "Exposure" should be revised as follows:</p> <p>"Exposure: means the quotient of dQ 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 stopping in air. The SI unit of exposure is the coulomb per kilogram (C/kg).</p> <p>Washington needs to make the above changes in order to meet the Compatibility Category A designation of 10 CFR 20.1003 Definition <i>Exposure</i>.</p>	We have fixed the formula symbols in the "Exposure" definition, page 5 of the PDF.