

CHAPTER 1

GENERAL PROVISIONS

Section 1. **Authority.**

(a) These rules and regulations are promulgated pursuant to the Wyoming Environmental Quality Act, Wyoming Statute (W.S.) §§ 35-11-2001 *et seq.* (2016). These rules and regulations are effective upon filing with the Secretary of State.

Section 2. **Purpose.**

(a) It is the purpose of these rules to state such requirements as shall be applied in the use of byproduct material and source material involved in the extraction and concentration of uranium and thorium in source material and ores at uranium and thorium milling facilities (referred throughout these rules as licensed material) such that the Department can ensure the protection of the public health and safety to all persons at, or in the vicinity of, the place of use, storage, or disposal.

Section 3. **Scope.**

(a) Except as otherwise specifically provided, these rules apply to all persons who receive, possess, use, offer and receive for transfer, own, or acquire any byproduct material or source material from the extraction and concentration of source material at uranium and thorium milling facilities. Nothing in these rules shall apply to any person to the extent such person is subject to regulation not relinquished by the United States Nuclear Regulatory Commission (NRC). These rules do not govern the mining or removal of source material in its natural state.

Section 4. **Incorporation by Reference (IBR) of Code of Federal Regulations (C.F.R.)**

(a) **AVAILABILITY OF REFERENCED MATERIAL.** The federal rules adopted by reference throughout these rules are maintained at the following locations:

(i) Electronic copies of the federal rules adopted by reference throughout these rules may be obtained from the U.S. Government Printing Office, <http://www.ecfr.gov>; and

(ii) Volumes of the federal rules adopted by reference throughout these rules are available for public inspection at the Wyoming Department of Environmental Quality, Uranium Recovery Program, 200 West 17th Street, Suite 10, Cheyenne, Wyoming 82002. Printed copies of the federal rules adopted by reference throughout these rules are also available at cost from the U.S. Government Printing Office, 732 North Capitol Street Northwest, Washington D.C. 20401 or at <http://bookstore.gpo.gov/catalog/laws-regulations/code-federal-regulations-cfrs-print>. Copies of the federal rules adopted by reference throughout these rules may be requested at cost through the Wyoming Department of Environmental Quality, which will order the materials from the U.S. Government Printing Office.

Section 5. **Definitions.**

The following terms, as used in these rules and regulations shall, unless the context otherwise requires, have the following meanings:

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

(b) "Act" means Environmental Quality Act, W.S. §§ 35-11-103 *et seq* (2016).

(c) "Action Limits" means the minimum and maximum values of a quality assurance measurement that can be interpreted as representing acceptable performance with respect to the parameter being tested. Values less than the minimum or greater than the maximum action limit or level indicate that corrective action must be taken. Action limits or levels are also sometimes called control limits or levels.

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

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

(f) "Agreement State" means a state with which the Atomic Energy Commission or the Nuclear Regulatory Commission has entered into an effective agreement under Section 274(b) of the Atomic Energy Act of 1954 (AEA), as amended (42 U.S.C. § 2021). Nonagreement State means any other State.

(g) "Airborne Radioactive Material" means a radioactive material dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases.

(h) "Airborne Radioactivity Area" means a room, enclosure, or area in which airborne radioactive materials, composed wholly or partly of licensed material, exists in concentrations:

(i) In excess of the derived air concentrations (DACs), specified in 10 C.F.R. Part 20, Appendix B, or

(ii) To such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI), or 12 DAC hours.

(i) "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.

(j) "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 response organizations to protect persons offsite.

(k) "Alternate Feed Processing" means the processing of any other matter other than mined natural or native matter from which source material [i.e. uranium or thorium] is extracted in a licensed uranium or thorium mill as authorized by RIS 00-023: Recent Changes to Uranium Recovery Policy dated November 30, 2000 and NRC regulatory Issue Summary 2012-06 NRC Policy Regarding Submittal of Amendments for Processing of Equivalent Feed at Licensed Uranium Recovery Facilities, dated April 16, 2012.

(l) "Annual Limit on Intake (ALI)" means the derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man that would result in a committed effective dose equivalent of 5 rems (0.05 Sv) or a committed dose equivalent of 50 rems (0.5 Sv) to any individual organ or tissue. (ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table 1, Columns 1 and 2, of appendix B to 10 CFR Part 20).

(m) "As Low as Reasonably Achievable (ALARA)" means making every reasonable effort to maintain exposures to radiation as far below the dose limits as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

(n) "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.

(o) "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.

(p) "Background Radiation" means radiation from:

(i) Cosmic sources;

(ii) Naturally occurring radioactive materials, including radon (except as a decay product of source or special nuclear material); and

(iii) 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 NRC or agreement states.

(q) "Becquerel (Bq)" means the SI unit of activity. One (1) becquerel is equal to one (1) disintegration or transformation per second.

(r) "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 rules, "radiobioassay" is an equivalent term.

(s) "Byproduct Material" means the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content as defined in section 11e. (2) of the AEA (42 U.S.C § 2014(e)(2) (2015)).

(t) "Calibration" means the determination of:

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

(ii) The strength of a source of radiation relative to a standard.

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

(v) "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.

(w) "Commencement of Construction" means taking any action defined as construction or any other activity at the site of a facility subject to these rules that has a reasonable nexus to radiological health or safety.

(x) "Commission" means the U.S. Nuclear Regulatory Commission or its duly authorized representatives. "Nuclear Regulatory Commission" and "NRC" are equivalent terms.

(y) "Committed Dose Equivalent (HT 50)" means the dose equivalent to organs or tissues of reference (T) that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

(z) "Committed Effective Dose Equivalent (HE 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 ($H_{E50} = \sum W_T H_{T50}$).

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

(ab) "Construction" means the installation of wells associated with the radiological operations (e.g., production, injection, or monitoring well networks associated with in-situ recovery or other facilities), the installation of foundations, or in-place assembly, erection, fabrication, or testing for any structure, system, or component of a facility or activity subject to these rules and regulations that are related to radiological safety or security. The term "construction" does not include:

- (i) Changes for temporary use of the land for public recreational purposes;
- (ii) Site exploration, including necessary borings to determine foundation conditions or other preconstruction monitoring to establish background information related to the suitability of the site, the environmental impacts of construction or operation, or the protection of environmental values;
- (iii) Preparation of the site for construction of the facility, including clearing of the site, grading, installation of drainage, erosion, and other environmental mitigation measures, and construction of temporary roads and borrow areas;
- (iv) Erection of fences and other access control measures that are not related to the safe use of, or security of, radiological materials subject to these rules;
- (v) Excavation;
- (vi) Erection of support buildings (e.g. construction equipment storage sheds, warehouses and shop facilities, utilities, concrete mixing plants, docking and unloading facilities, and office buildings) for use in connection with the construction of the facility;
- (vii) Building of service facilities (e.g., paved roads, parking lots, railroad spurs, exterior utility, and lighting systems, potable water systems, sanitary sewerage treatment facilities, and transmission lines);
- (viii) Procurement or fabrication of components or portions of the proposed facility occurring at other than the final, in place location at the facility; or
- (ix) Taking any other action that has no reasonable nexus to radiological health and safety.

(ac) "Contamination" means the presence of radioactive substance on a surface in quantities in excess of unrestricted release limits. For limits on transportation please refer to 10 C.F.R. § 71.4. For uranium recovery operations please refer to Regulatory Guide 8.30 Health Physics Surveys in Uranium Recovery Facilities Section 2.5, Table 2 Revision 1 May 2002, which states that contamination exists in two phases. Additionally for areas where beta and gamma contamination exist please refer to the references in Table 2 of Regulatory Guide 8.30.

(i) Fixed radioactive contamination means radioactive contamination that cannot be removed from a surface during normal conditions.

(ii) Non-fixed or removable radioactive contamination means radioactive contamination that can be removed from a surface during normal conditions.

(ad) "Controlled Area" means an area, outside of a restricted area but inside the site boundary, access to which can be limited by the licensee for any reason.

(ae) "Critical Group" means the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances.

(af) "Curie" means a unit of measurement of activity. One curie (Ci) is that quantity of radioactive material which decays at the rate of 3.7×10^{10} disintegrations per second or transformations per second (dps or tps).

(ag) "Declared Pregnant Woman" means a woman who has voluntarily informed the licensee, 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.

(ah) "Decommission" means to remove a facility or site safely from service and reduce residual radioactivity to a level that permits:

- (i) Release of property for unrestricted use and termination of the license; or
- (ii) Release of the property under restricted conditions and termination of the license.

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

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

(ak) "Department" means the State of Wyoming Department of Environmental Quality.

(al) "Derived Air Concentration (DAC)" means the concentration of given radionuclide in air which, if breathed by reference man for a working year of 2,000 hours under conditions of light work (inhalation rate of 1.2 cubic meters of air per hour), results in an intake of 1 ALI. DAC values are given in 10 C.F.R. Part 20, Appendix B, Table 1 Column 3.

(am) "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 may take 2,000 DAC-hours to represent 1 ALI equivalent to a committed effective dose equivalent of 5 rems (0.05 Sv).

(an) "Direct Disposal" means disposal of non-11e.(2) byproduct material in a uranium mill tailings impoundment as authorized by RIS 00-023: Recent Changes to Uranium Recovery Policy dated November 30, 2000.

(ao) "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.

(ap) "Disposal 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 disposable half-mask respirators or disposable escape-only self-contained breathing apparatus (SCBA).

(aq) "Distinguishable from Background" means that the detectable concentration of a radionuclide is statistically different from the background concentration of that radionuclide in the vicinity of the site or, in the case of structures, in similar materials using adequate measurement technology, survey, and statistical techniques.

(ar) "Dose" means a generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent. For purposes of these rules, "radiation dose" is an equivalent term.

(as) "Dose Equivalent (H_T)" means the product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units of dose equivalent are the rem and sievert (Sv).

(at) "Dose Limits" means the permissible upper bounds of radiation doses established in accordance with these rules. For purpose of these rules, "limits" is an equivalent term.

(au) "Dosimetry Processor" means an individual or organization, that is National Voluntary Laboratory Accreditation Program (NAVLAP) approved, that processes and evaluates individual monitoring equipment in order to determine the radiation dose delivered to the equipment.

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

(aw) "Embryo/Fetus" means the developing human organism from conception until the time of birth.

(ax) "Entrance or Access Point" means any location through which an individual could gain access to radiation areas or to licensed radioactive materials. This includes entry or exit portals of sufficient size to permit human entry, irrespective of their intended use.

(ay) "Equivalent Feed" refers to ion exchange (IX) resin that is loaded with uranium at facilities licensed for source material (i.e. water treatment plants or mine dewatering operations) or licensed uranium recovery facilities whether conventional, heap leach, or ISR facilities. RIS 2012-06 NRC Policy Regarding Submittal of Amendments for Processing of Equivalent Feed at Licensed Uranium Recovery Facilities details the permitting of equivalent feed at uranium recovery operations.

(az) "Exclusive Use" means the sole use by a single consignor or a conveyance for which all initial, intermediate, and final loading and unloading are carried out in accordance with the direction of the consignor or consignee. The consignor and the carrier must ensure that any loading or unloading is performed by personnel having radiological training and resources appropriate for safe handling of the consignment. The consignor must issue specific instructions, in writing, for maintenance of exclusive use shipment controls, and include them with the shipping paper information provided to the carrier by the consignor.

(ba) "Exposure" means being exposed to ionizing radiation or to radioactive material. For purposes of these rules, this term is used as a verb.

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

(bc) "External Dose" means that portion of the dose equivalent received from a source of radiation outside the body.

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

(be) "Financial Assurance" means the method of assuring that sufficient funds will be available at the time of license termination and decommissioning of the facility to cover all costs associated with the decommissioning.

(bf) "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.

(bg) "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.

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

(bi) "Generally Applicable Environmental Radiation Standards" means standards issued by the U.S. Environmental Protection Agency under the authority of the AEA, 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.

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

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

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

(bm) "Individual" means any human being.

(bn) "Individual monitoring" means:

(i) The assessment of dose equivalent by:

(A) Use of devices designed to be worn by an individual, or

(B) Survey data.

(ii) The assessment of committed effective dose equivalent by:

(A) Bioassay, or

(B) By determination of the time-weighted air concentrations to which an individual has been exposed (i.e. DAC-hours).

(bo) "Individual Monitoring Devices" means devices designed to be worn by a single individual for the assessment of dose equivalent. For purposes of these rules, individual monitoring equipment and personnel monitoring equipment are equivalent terms. Examples of individual monitoring devices are film badges, thermoluminescence dosimeters (TLD's), pocket ionization chambers, and personal air sampling devices.

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

(bq) "Lens Dose Equivalent (LDE)" means the external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm²).

(br) "License" means a form of permission given by the Department to an applicant who has met the requirements for licensing set out in the Act and these rules.

(bs) "Licensee" means a person who is licensed by the Department in accordance with

the Act and these rules.

(bt) "Licensed material" means source material involved in the extraction and concentration of uranium and thorium in source material and ores at uranium and thorium milling facilities and the management and disposal of 11e.(2) byproduct material received, possessed, used, transferred, or disposed of under a license issued by the Department.

(bu) "Limits (dose limits)" means the permissible upper bounds of radiation doses.

(bv) "Loose Fitting Facepiece" means a respiratory inlet covering that is designed to form a partial seal with the face.

(bw) "Lost or Missing Licensed Material" means licensed material whose location is unknown. It includes material that has been shipped but has not reached its destination and whose location cannot be readily traced in the transportation system.

(bx) "Low Specific Activity (LSA) Material" means radioactive material with limited specific activity which is non-fissile or is accepted under 10 C.F.R. § 71.15, and which satisfies the description and limits set forth in Chapter 9 of these Rules. Shielding materials surrounding the LSA material may not be considered in determining the estimated average specific activity of the package contents. The LSA material must be in one of three groups.

(i) LSA-I:

(A) Uranium and thorium ores, concentrates of uranium and thorium ores, and other ores containing naturally occurring radionuclides that are intended to be processed for the use of these radionuclides;

(B) Natural uranium, depleted uranium, natural thorium or their compounds or mixtures, provided they are unirradiated and in solid or liquid form;

(C) Radioactive material other than fissile material, for which the A_2 value is unlimited; or

(D) Other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the value for exempt material activity concentration determined in accordance with 10 C.F.R. Part 71, Appendix A.

(ii) LSA-II:

(A) Water with tritium concentration up to 0.8 TBq/liter (20.0 Ci/liter),
or

(B) Other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 10^{-4} A_2/g for solids and

gases, and 10^{-5} A₂/g for liquids.

(iii) LSA-III Solids (e.g., consolidated wastes, activated materials), excluding powders, that satisfy the requirements of 10 C.F.R. § 71.77, in which:

(A) The radioactive material is distributed throughout a solid or collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen, ceramic, etc.);

(B) The radioactive material is relatively insoluble, or it is intrinsically contained in a relative insoluble material, so that even under loss of packaging, the loss of radioactive material per package by leaching, when placed in water for 7 days will not exceed 0.1 A₂; and

(C) The estimated average specific activity of the solid, excluding any shielding material, does not exceed 2×10^{-3} A₂/g.

(by) "Member of the Public" means an individual except when that individual is receiving an occupational dose.

(bz) "Minor" means an individual less than 18 years of age.

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

(cb) "Natural Thorium" means thorium with the natural occurring distribution of thorium isotopes (essentially 100 weight percent thorium-232).

(cc) "Natural Uranium" means uranium (which may be chemically separated) with the naturally occurring distribution of uranium isotopes (approximately 0.711 weight percent uranium-235 and the remainder by weight essentially uranium-238).

(cd) "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.

(ce) "Nonstochastic Effect" means health effects, 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 (also called a deterministic effect). For the purposes of these rules deterministic effects are equivalent terms.

(cf) "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

or other person. An Occupational dose does not include doses received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released under 10 C.F.R. Part § 35.75, from voluntary participation in medical research programs, or as a member of the public.

(cg) "Ore" means a natural or native matter (not a material licensed by the State) that may be mined and treated for the extraction of any of its constituents or any other matter from which source material [i.e. uranium or thorium] is extracted in a licensed uranium or thorium mill as authorized by RIS 00-023: Recent Changes to Uranium Recovery Policy dated November 30, 2000 and NRC Regulatory Issue Summary 2012-06 NRC Policy Regarding Submittal of Amendments for Processing of Equivalent Feed at Licensed Uranium Recovery Facilities, dated April 16, 2012.

(ch) "Person" means an individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, municipality or any other political subdivision of the State, or any interstate body or any other legal entity.

(ci) "Physician" means a medical doctor or doctor of osteopathy licensed by a State or Territory of the United States, the District of Columbia, or the Commonwealth of Puerto Rico to prescribe drugs in the practice of medicine.

(cj) "Positive Pressure Respirator" means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

(ck) "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.

(cl) "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.

(cm) "Principal Activities" as used in these rules, means activities authorized by the license which are essential to achieving the purpose(s) for which the license was issued or amended. Storage during which no licensed material is accessed for use or disposal and activities incidental to decontamination or decommissioning are not principal activities

(cn) "Program" means the State of Wyoming's Uranium Recovery Program.

(co) "Public Dose" means the dose received by a member of the public from exposure to radiation or to radioactive materials released by a licensee, or to any other source of radiation under the control of a 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 in accordance with 10 C.F.R. § 35.75, or from voluntary participation in medical research programs.

(cp) "Qualitative Fit Test (QLFT)" means a pass/fail fit test to assess the adequacy of

respirator fit that relies on the individual's response to a test agent.

(cq) "Quality factor (Q)" means the modifying factor, listed in Tables 1 of Section 7 of this Chapter and Table 1004(b).2 of 10 CFR 20.1004, that is used to derive dose equivalent from absorbed dose.

(cr) "Quantitative Fit Test (QNFT)" means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

(cs) "Quarter" means a period of time equal to one-fourth of the year observed by the licensee (approximately 13 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.

(ct) "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 rules, ionizing radiation is an equivalent term. Radiation, as used in these rules, does not include non-ionizing radiation, such as radio or microwaves, visible, infrared, or ultraviolet light.

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

(cv) "Radiation Level" means the radiation dose-equivalent expressed in millisieverts per hour or mSv/h (millirems per hour or mrem/h).

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

(cx) "Recovery or Milling" refers to the definition in W.S. §§ 35-11-103 (2016).

(cy) "Reference Man" means a hypothetical aggregation of human physical and physiological characteristics arrived at 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.

(cz) "Residual Radioactive Material" means (1) Waste (which the Secretary of Energy determines to be radioactive) in the form of tailings resulting from the processing of ores for the extraction of uranium and other valuable constituents or the ores; and (2) other waste (which the Secretary of Energy determines to be radioactive) at a processing site which relates to such processing, including any residual stock of unprocessed ores or low-grade materials. This term is used only with respect to materials at sites subject to remediation under Title I of the Uranium Mill Tailings Radiation Control Act of 1978 as amended.

(da) "Residual Radioactivity" means radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the licensee's control. This

includes radioactivity from all licensed and unlicensed sources used by the licensee, but excludes background radiation. It also includes radioactive materials remaining at the site as a result of routine or accidental releases of radioactive material at the site and previous burials at the site, even if those burials were made in accordance with the provisions of 10 C.F.R. Part 20 which is incorporated by reference in Chapter 3 of these rules.

(db) "Respiratory Protective Device" means an apparatus, such as a respirator, used to reduce the individual's intake of airborne radioactive materials.

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

(dd) "Roentgen (R)" means the special unit of exposure. One roentgen equals 2.58×10^{-4} coulombs per kilogram of air. *See* exposure, defined above.

(de) "Sanitary Sewerage" means a system of public sewers carrying off waste water and refuse, but excluding sewage treatment facilities, septic tanks, and leach fields owned and operated by the licensee.

(df) "Self-Contained Breathing Apparatus (SCBA)" means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by user.

(dg) "Shallow Dose Equivalent (Hs)" which applies to the external exposure of the skin of the whole body or the skin of an extremity and is taken as the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm²).

(dh) "SI" means an abbreviation of the International System of Units.

(di) "Site Area Emergency" means events 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 organizations to protect persons offsite.

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

(dk) "Source material" means:

(i) Uranium or thorium, or any combination thereof, in any physical or chemical form, or

(ii) Ores which contain by weight one-twentieth of one percent (0.05 percent), or more of uranium, thorium, or any combination thereof. Source material does not include special nuclear material.

(dl) "Specific Activity" means the radioactivity of the radionuclide per unit mass of the nuclide. The specific activity of a material in which the radionuclide is essentially uniformly distributed is the radioactivity per unit mass of material. The Specific Activity for Natural Uranium is $6.77E-7$ Ci per gram of U.

(dm) "Stochastic Effects" means health effects that occur 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 incidences are examples of stochastic effects.

(dn) "Supplied-Air Respirator (SAR)" means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

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

(dp) "Test" means the process of verifying compliance with an applicable rule.

(dq) "Tight Fitting Facepiece" means a respiratory inlet covering that forms a complete seal with the face.

(dr) "Total Effective Dose Equivalent (TEDE)" means the sum of the effective dose equivalent for external exposures and the committed effective dose equivalent for internal exposures.

(ds) "Unrefined and Unprocessed Ore" means ore in its natural form prior to any processing, such as grinding, roasting, beneficiating, or refining. Processing does not include sieving or encapsulation of ore or preparation of samples for laboratory analysis.

(dt) "Unrestricted Area" means an area, to which access is neither limited nor controlled by the licensee. For purposes of these rules, "uncontrolled area" is an equivalent term.

(du) "Unrestricted Use" means that the facility area, or object may be used by individuals for any purpose without limit or control of the licensee.

(dv) "Uranium Fuel Cycle" means the operations of milling of uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity by a light-water-cooled nuclear power plant using uranium fuel, and reprocessing of spent uranium fuel to the extent that these activities directly support the production of electrical power for the public use. Uranium fuel cycle does not include mining operations, operations at waste disposal sites, transportation of radioactive material in support of these operations, and the reuse of recovered non-uranium special nuclear and byproduct materials from the cycle.

(dw) "Uranium milling" means any activity that results in the production of byproduct

material as defined in W.S. §§ 35-11-103 (2016). *See also* Recovery or Milling.

(dx) "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.

(dy) "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 500 rads (5 grays) in 1 hour at 1 meter from a radiation source or 1 meter from any surface that the radiation penetrates.

(dz) "Waste" means those low-level radioactive wastes containing source, special nuclear, or byproduct material that are acceptable for disposal in a land disposal facility. For the purpose of this definition, low level radioactive waste means radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or byproduct material as defined in this Chapter.

(ea) "Week" means seven consecutive days starting on Sunday.

(eb) "Weighting Factor (W_T)" means for an organ or tissue (T) is the proportion of the risk of stochastic effects resulting from irradiation of that organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly. For calculating the effective dose equivalent, the values of W_T are:

Organ or Tissue	W_T
Gonads	0.25
Breasts	0.15
Red bone marrow	0.12
Lung	0.12
Thyroid	0.03
Bone Surfaces	0.03
Remainder	¹ 0.30
Whole Body	² 1.00

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

² For the purposes 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 weighting factors for external exposure will be approved on a case-by-case basis until such time as specific guidance is issued.

(ec) "Whole Body" means, for purposes of external exposure, head, trunk including male gonads, arms above the elbow, or legs above the knees.

(ed) "Worker" means an individual engaged in work under a license issued by the Department and controlled by a licensee, but does not include the licensee.

(ee) "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.

(ef) "Working Level Month (WLM)" means an exposure to one working level for 170 hours. 2,000 working hours per year divided by 12 months per year is approximately equal to 170 hours per month.

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

Section 6. Definitions applicable solely to criteria listed in 10 C.F.R. Part 40, Appendix A.

The following definitions apply only to criteria listed in 10 C.F.R. Part 40, Appendix A which outline the operation of Uranium Mills and disposition of tailings or wastes produced by the extraction or concentration of source material from ores processed primarily for their source material content.

(a) "Aquifer" means a geological formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs. Any saturated zone created by uranium or thorium recovery operations would not be considered an aquifer unless the zone is potentially (1) hydraulically interconnected to a natural aquifer, (2) capable of discharge to surface water, or (3) reasonably accessible because of migration beyond the vertical projection of the boundary of the land transferred for long-term government ownership and care in accordance with 10 C.F.R. Part 40, Appendix A Criterion 11.

(b) "As expeditiously as practicable considering technological feasibility" for the purpose of 10 C.F.R. Part 40, Appendix A, Criterion 6A, means as quickly as possible considering: the physical characteristics of the tailings and the site; the limits of available technology, the need for consistency with the mandatory requirements of other regulatory programs, and factors beyond the control of the licensee. The phrase permits consideration of cost of compliance only to the extent specifically provided for by use of the term available technology.

(c) "Available Technology" means technologies and methods for emplacing a final radon barrier on uranium mill tailings piles or impoundments. This term shall not be construed to include extraordinary measures or techniques that would impose costs that are grossly excessive as measured by practice within the industry (or one that is reasonably analogous), (such as, by way of illustration only, unreasonable over time, staffing, or transportation requirements, etc., considering

normal practice in the industry; laser fusion of soil, etc.), provided there is reasonable progress toward emplacement of the final radon barrier. To determine grossly excessive costs, the relevant baseline against which costs shall be compared is the cost estimate for tailings impoundment closure contained in the licensee's approved reclamation plan, but costs beyond these estimates shall not automatically be considered grossly excessive.

(d) "Closure" means the activities following operations to decontaminate and decommission the buildings and site used to produce byproduct materials and reclaim the tailings and/or waste disposal area.

(e) "Closure Plan" means the Commission approved plan to accomplish closure.

(f) "Compliance Period" begins when the Commission sets secondary ground-water protection standards and ends when the owner or operator's license is terminated and the site is transferred to the State or Federal agency for long-term care.

(g) "Dike" means an embankment or ridge of either natural or man-made materials used to prevent the movement of liquids, sludges, solids, or other materials.

(h) "Disposal Area" means the area containing byproduct material to which the requirements of 10 C.F.R. Part 40, Appendix A, Criterion 6 apply.

(i) "Existing Portion" means the land surface area of an existing surface impoundment on which significant quantities of uranium or thorium byproduct materials had been placed prior to September 30, 1983.

(j) "Factors Beyond the Control of the Licensee" means factors proximately causing delay in meeting the schedule in the applicable reclamation plan for the timely emplacement of the final radon barrier notwithstanding the good faith efforts of the licensee to complete the barrier in compliance with paragraph (1) of 10 C.F.R. Part 40, Appendix A, Criterion 6A. These factors may include but are not limited to:

(i) Physical conditions at the site;

(ii) Inclement weather or climate conditions;

(iii) An act of God;

(iv) An act of war;

(v) A judicial or administrative order or decision, or change to the statutory, regulatory, or other legal requirements applicable to the licensee's facility that would preclude or delay the performance of activities required for compliance;

(vi) Labor disturbances;

(vii) Any modifications, cessation or delay ordered by State, Federal, or local agencies;

(viii) Delays beyond the time reasonably required in obtaining necessary government permits, licenses, approvals, or consent for activities described in the reclamation plan proposed by the licensee that result from agency failure to take final action after the licensee has made a good faith, timely effort to submit legally sufficient applications, responses to request (including relevant data requested by the agencies), or other information, including approval of the reclamation plan; and

(ix) An act or omission of any third party over whom the licensee has no control.

(k) "Final Radon Barrier" means the earthen cover (or approved alternative cover) over tailings or waste constructed to comply with 10 C.F.R. Part 40, Appendix A, Criterion 6 of this appendix (excluding erosion protection features).

(l) "Groundwater" means water below the land surface in a zone of saturation. For purposes of 10 C.F.R. Part 40, Appendix A, groundwater is the water contained within an aquifer as defined above.

(m) "Leachate" means any liquid, including any suspended or dissolved components in the liquid that has percolated through or drained from the byproduct material.

(n) "Licensed Site" means the area contained within the boundary of a location under the control of persons generating or storing byproduct materials under a Commission or an agreement state license.

(o) "Liner" means a continuous layer of natural or man-made materials, beneath or on the sides of a surface impoundment which restricts the downward or lateral escape of byproduct material, hazardous constituents, or leachate.

(p) "Milestone" means an action or event that is required to occur by an enforceable date.

(q) "Operations" this definition is specific for uranium or thorium tailings and means that a uranium or thorium mill tailings pile or impoundment is being used for the continued placement of byproduct material or is in standby status for such placement. A pile or impoundment is in operation from the day that byproduct material is first placed in the pile or impoundment until the day final closure begins.

(r) "Point of Compliance" is the site specific location in the uppermost aquifer where the groundwater protection standard must be met.

(s) "Reclamation Plan" for the purposes of 10 C.F.R. Part 40, Appendix A Criterion 6A means the plan detailing activities to accomplish reclamation of the tailings or waste disposal area in accordance with the technical criteria in this appendix. The reclamation plan must include a

schedule from reclamation milestones that are key to the completion of the final radon barrier including as appropriate, but not limited to, windblown tailings retrieval and placement on the pile, interim stabilization (including dewatering or the removal of freestanding liquids and recontouring), and final radon barrier construction (reclamation of tailings must also be addressed in the closure plan; the detailed reclamation plan may be incorporated into the closure plan).

(t) "Surface Impoundment" means a natural topographic depression, man-made excavation, or diked area, which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well.

(u) "Uppermost Aquifer" means the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary.

Section 7. Units of Exposure and Dose.

(a) As used in these rules, the unit of exposure is the coulomb per kilogram (C per kg). One roentgen is equal to 2.58×10^{-4} coulomb per kilogram of air.

(b) As used in these rules, the units of dose are:

(i) Gray (Gy) is the SI unit of absorbed dose. One gray is equal to an absorbed dose of one joule per kilogram. One gray equals 100 rad.

(ii) Rad is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 erg per gram or 0.01 joule per kilogram. One rad equals 0.01 Gy.

(iii) Rem is the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor. One rem equals 0.01 Sv.

(iv) Sievert (Sv) is the SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sievert is equal to the absorbed dose in gray multiplied by the quality factor. One Sv equals 100 rem.

(c) As used in these rules, the quality factors for converting absorbed dose to dose equivalent are shown in Table 1.

TABLE 1

Quality Factors and Absorbed Dose Equivalencies

Type of Radiation	Quality Factor (Q)	Absorbed Dose Equal to a Unit Dose Equivalent
X, gamma, or beta radiation and high-speed electrons	1	1

Type of Radiation	Quality Factor (Q)	Absorbed Does Equal to a Unit Dose Equivalent
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

For the column in Table 1 labeled "Absorbed Dose Equal to a Unit Dose Equivalent," the absorbed dose in rad is equal to one rem or the absorbed dose in gray is equal to one Sv.

Section 8. Units of Radioactivity.

For purposes of these rules, activity is expressed in the SI unit of becquerel (Bq), or in the special unit of curie (Ci), or their multiples, or disintegrations or transformations per unit of time.

Section 9. Communication and Referenced Materials.

All communication and reports concerning parts of these rules, and application filled thereunder, should be addressed to the Department.

Section 10. Deliberate misconduct.

(a) No person may do any of the following:

(i) Engage in deliberate misconduct that causes or would have caused, if not detected, a licensee under this chapter to be in violation of any rule or order of the Department; or any term, condition or limitation of any license issued by the Department under this chapter; or

(ii) Deliberately submit to the Department any information that the person knows to be incomplete or inaccurate. This includes licensees, and contractors and subcontractors to licensees.

(iii) Deliberate misconduct by a person means an intentional act or omission that the person knows:

(A) Would cause a licensee to be in violation of any rule, regulation, or order; or any term, condition, or limitation issued by the Department; or

(B) Constitutes a violation of a requirement, procedure, instruction, contract, purchase order, or policy of a licensee or a contractor or subcontractor of a licensee.

Section 11. Exemptions.

(a) The Department may upon application or upon its own initiative, grant such exemptions or exception from requirements as it determines are authorized by law and will not result in undue hazard to public health and safety or property. Provisions for exceptions are provided for in W.S. § 35-11-2003(c) (2016).

(b) Additionally, the Department authorizes exemptions for the possession, use, transfer, or acquisition of any byproduct material, or source material extracted and concentrated at a uranium or thorium milling facility to any U.S. Department of Energy contractor or subcontractor and any U.S Nuclear Regulatory Commission contractor or subcontractor of the following categories operating within this State:

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

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

(iii) Prime contractors of the U.S. Department of Energy using or operating nuclear reactors or other nuclear devices in the U.S. Government owned vehicles or vessels; and

(iv) Any other prime contractor or subcontractor of the U.S. Department of Energy of the U.S. Nuclear Regulatory Commission when the State and the U.S. Nuclear Regulatory Commission determine that:

(A) The exemption of the prime contractor or subcontractor is authorized by law; and

(B) 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.

Section 12. **Records.**

(a) A licensee shall maintain records showing the receipt, transfer, and disposal of all licensed material.

(b) All records required by this chapter shall be accurate and factual.

(c) Additional records requirements are specified elsewhere in these rules. If the record retention period is not specified, the record shall be maintained for a period of three years.