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*. 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 source material recovered from any mineral resources processed primarily for purposes other than obtaining the source material content (referred to 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 source material recovered from any mineral resources processed primarily for purposes other than obtaining the source material content. For the purposes of these rules, the term "mineral resources" is defined in W.S. § 35-11-2001(a). 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 or independent or commercial laboratory facilities that possess, use, or accept source material. These rules apply to laboratories located at facilities licensed under these regulations.

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, Source Material 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.*

(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). Non-agreement 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 off-site response organizations to protect persons off-site.

(k) "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).

(l) "As Low as (is) 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.

(m) "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.

(n) "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.

(o) "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.

(iv) Background radiation does not include radiation from source, byproduct, or special nuclear materials regulated by the Commission.

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

(q) "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.

(r) "Byproduct Material" is defined in W.S. § 35-11-103(j)(i).

(s) "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.

(t) "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.

(u) "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.

(v) "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.

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

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

(y) "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 ($H_{E,50}=\sum W_T H_{T,50}$).

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

(aa) "Contamination" means the presence of radioactive substance on a surface in quantities in excess of unrestricted release limits.

(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.

(ab) "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.

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

(ad) "Curie" means the special unit of activity. One curie is equal to $3.7x10^{10}$ disintegrations per second which is equal to $3.7x10^{10}$ becquerels which is equal to $2.22x10^{12}$ disintegrations per minute.

(ae) "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.

(af) "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.

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

(ah) "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.

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

(aj) "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.

(ak) "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).

(al) "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.

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

(an) "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.

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

(ap) "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).

(aq) "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.

(ar) "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.

(as) "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 ($H_E = \sum W_T H_T$).

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

(au) "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.

(av) "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.

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

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

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

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

(ba) "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.

(bb) "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.

(bc) "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.

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

(be) "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.

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

(bg) "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 (1 mSv), in 1 hour at 30 centimeters from the radiation source or 30 centimeters from any surface that the radiation penetrates.

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

(bi) "Individual" means any human being.

(bj) "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; or

(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).

(bk) "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.

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

(bm) "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/cm^2).

(bn) "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.

(bo) "Licensee" means a person who is licensed by the Department in accordance with the Act and these rules.

(bp) "Licensed material" means source material recovered from any mineral resources processed primarily for purposes other than obtaining the source material content and the management and disposal of associated byproduct material received, possessed, used, transferred, or disposed of under a license issued by the Department.

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

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

(bs) "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.

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

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

(bv) "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.

(bw) “Nationally tracked source” is a sealed source containing a quantity equal to or greater than Category 1 or Category 2 levels of any radioactive material listed in Appendix E of 10 C.F.R. Part 20. 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.

(bx) "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.

(by) "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.

(ca) "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.

(cb) "Operation" means all of the activities, equipment, premises, facilities, structures, roads, rights-of-way, waste and refuse areas, storage and processing areas, and shipping areas used in the process of excavating or removing overburden and minerals from the affected land or for removing overburden for the purpose of determining the location, quality or quantity of a natural, mineral deposit or for the reclamation of affected lands.

(cc) "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 and any legal successor, representative, agent, or agency of the foregoing.

(cd) "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.

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

(cf) "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.

(cg) "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.

(ch) "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

(ci) "Program" means the State of Wyoming's Source Material Program.

(cj) "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.

(ck) "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.

(cl) "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.

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

(cn) "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.

(co) "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.

(cp) "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.

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

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

(cs) "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.

(ct) "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.

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

(cv) "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.

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

(cx) "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.

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

(cz) "Shallow Dose Equivalent (H_s)" 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/cm^2).

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

(db) "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 off-site organizations to protect persons off-site.

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

(dd) "Source material" is defined in W.S. § 35-11-103(j)(iii).

(de) "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 6.77×10^{-7} Ci per gram of U.

(df) "Special Nuclear Material" means:

(i) Plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, and any other material that the Commission, pursuant to 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

(ii) Any material artificially enriched by any of the foregoing but does not include source material.

(dg) "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 incidence are examples of stochastic effects.

(dh) "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.

(di) "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.

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

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

(dl) "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.

(dm) "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.

(dn) "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.

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

(dp) "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.

(dq) "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.

(dr) "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.

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

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

Organ 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.

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

(dv) "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.

(dw) "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.

(dx) "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.

(dy) "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. 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
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 7. **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 8. Communication and Referenced Materials.

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

Section 9. 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 or applicant under these rules 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) 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, applicant, contractor or subcontractor of a licensee as mandated by the Department.

(b) A person who violates paragraph (a)(i) or (a)(ii) of this section may be subject to enforcement action in accordance with Chapter 2 of these rules.

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

Section 10. **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).

(b) Except to the extent that the Department of Energy's (DOE) facilities or activities, subject to licensing pursuant to Section 202 of the Energy Reorganization Act of 1974 (42 U.S.C. § 5842.), are involved, any prime contractor of the DOE is exempt from the requirements for a license set forth in 62, 63, and 64 of the Act (42 U.S.C. § 2111 and 42 U.S.C. § 2112) and from these rules to the extent that such contractor, under his prime contract with the DOE

manufactures, produces, transfers, receives, acquires, owns, possesses, or uses byproduct material for:

(i) The performance of work for the DOE at a United States Government owned or controlled site, including the transportation of source material to or from such site and the performance of contract services during temporary interruptions of such transportation;

(ii) Research in, or development, manufacture, storage, testing, or transportation of, atomic weapons or components thereof; or

(iii) The use or operation of nuclear reactors or other nuclear devices in a United States Government owned vehicle or vessel.

(iv) In addition to the foregoing exemptions, and subject to the requirement for licensing of DOE facilities and activities pursuant to section 202 of the Energy Reorganization Act of 1974 or the Uranium Mill Tailings Radiation Control Act of 1980, any prime contractor or subcontractor of the DOE or the Nuclear Regulatory Commission is exempt from the requirements for a license set forth in sections 62, 63, and 64 of the Act and from the regulations in this Chapter to the extent that such prime contractor or subcontractor receives, possesses, uses, transfers or delivers source material under his prime contract or subcontract when the Department determines that the exemption of the prime contractor or subcontractor is authorized by law; and 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.

(c) The Department fully adopts and hereby incorporates by reference the exemption in 10 C.F.R. 40.12(a) for common and contract carriers, freight forwarders, warehousemen, and the U.S. Postal Service.

(d) The Department fully adopts and hereby incorporates by reference the requirements for unimportant quantities of source material in 10 C.F.R. 40.13, along with the exclusion of 40.13(c)(5)(iv).

Section 11. 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) The Department fully adopts and hereby incorporates by reference recordkeeping requirements in 10 C.F.R. 40.61 (a), (b), (d), (e), and (f).

(d) If the record retention period is not specified, the record shall be maintained for a period of three years.